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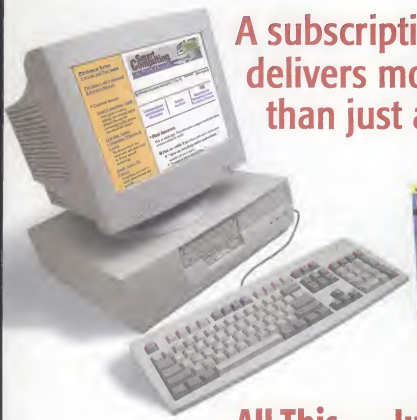

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APPLICATIONS

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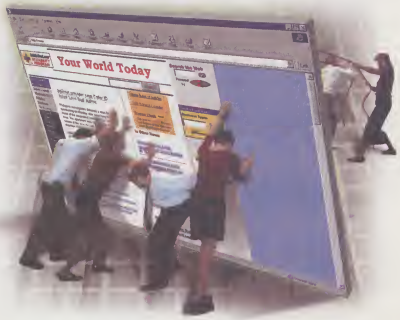

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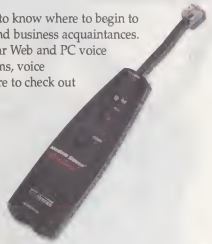

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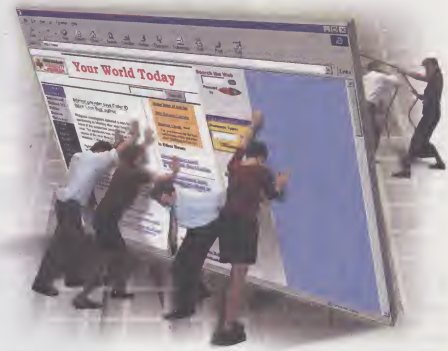
Build A Web Site

Follow Along As We Create A Page With Netscape Composer

Building a well-designed Web site has become a surprisingly simple task in the past few years. Gone are the days when you had to have a command of HTML (Hypertext Markup Language, the coding that underlies much of the Web) to construct Web pages. Today, nearly every Web-creation program, or Web editor, will automatically generate the information browsers need to replicate Web pages for viewing.

Some offer users the option of either writing pages using HTML or designing them in what is referred to as WYSIWYG (What You See Is What You Get) mode. Using the latter option, designers view the actual page as they create it, entering text and placing graphics in much the same way as they would with a word processor.



■ **Introducing Composer.** One of the easiest WYSIWYG Web editors to use is Netscape Composer. Composer is a component of Netscape Communicator, a popular Web browser/e-mail/news reader suite that is available for free download from Netscape's Web site (http://www.netscape.com). Composer is limited in scope. For example, it doesn't automatically generate frames (subdivisions within a Web page that each act autonomously), and it can't automatically create forms for Web visitors to fill out.

Composer also does not support the addition of sounds, video, java scripts—basically any elements other than text and pictures—to its Web sites. (You can manually add any of these components using HTML code.)

Because of these limitations, Composer is not a good option for those wishing to construct extensive Web landscapes strewn with video, fanciful animations, and other high-tech wizardry; it's also not suitable for complicated retail-sales sites.

It is, however, several steps above the fill-in-the-blanks Web site "wizards" supplied at Web-building communities such as Yahoo! GeoCities (http://geocities.yahoo.com). Unlike most Web wizards, Composer offers a fair degree of flexibility for customization. In addition, it provides insight into the fundamentals of Web-page construction that users can later employ in more complex programs if they wish.

What Composer does do, it does well. Such functions as indenting text and wrapping text around graphics can be difficult to accomplish in some Web editors because HTML doesn't accommodate these effects very well. Composer handles them with aplomb in simple, word-processor-like fashion. Composer makes short, simple work of both the basic and not-so-basic functions required to build a solid site, including keying and formatting text and cutting and pasting images and links around the site. In short, it takes a logical, user-friendly approach to what can often be a less-than-logical process.

Because it is both easy to use and accommodating, Composer is a perfect program for beginners who are taking their first steps in Web design. That's why we've chosen it as the Web editor for the site we'll build in this article, and why we think you'll also enjoy using it for your site.

Once you've learned the basics, you can move on to more powerful (and costly) programs such as Microsoft FrontPage or Adobe Page Mill if you wish, taking the knowledge you've gained with Composer along with you.

Key Points

- Netscape Composer offers a great deal of flexibility for customization, but it's fairly limited in scope.
- The latest version of Netscape Communicator is version 4.73; there's a Preview Release (beta) of Communicator 6.
- Use Composer to add article graphics, hyperlinks, and an e-mail form to your Web site.

You can also learn to manually write HTML and enhance your Composer-based Web pages. But some Composer users may be perfectly content with their designs and never have the desire to move on at all, which is fine.

In this article, we'll walk you through the steps involved in installing Composer and then using it to build and upload a Web-ready site. If you like, you can follow along with us, substituting your own components for ours to create a fabulous site of your own. If you're not ready to create your own site, complete with text and graphics, just substitute any graphic or clip art for the ones we use and use our sample text, which you'll find within this article and in the figures throughout the next few pages. Before you begin, you might want to familiarize yourself with the Composer interface. For help, see the sidebar "A Quick Tour."

Getting Ready.

If you already have Netscape Communicator 3 or 4 installed on your computer, you also have Netscape Composer. The program hasn't changed dramatically since it was introduced, but to make certain you're up to speed, you should probably update to the latest version of Communicator, 4.73, which is the version we use in this article.

At the time this issue went to press, Netscape had released a beta version of its next-generation product, Netscape 6. We don't recommend you use it unless you have a dedicated test environment, a separate computer (or area within your computer) set up specifically so that it does not access your regular operating files. We don't have one, and we're assuming you don't either, so we'll stick with 4.73 for now.

To download either the entire Communicator 4.73 program or the upgrade, visit the Netscape Web site (http://www.netscape.com) and look on the bar at the left side of the page under Top Picks for the 4.7: CD/Download option. Click it, and you'll be transported to the download page for Communicator 4.73.

If you are upgrading from Netscape 4.04 or higher, you can choose the Smart Update option, and Netscape will automatically update the program. If you are upgrading from an earlier version or installing Communicator for the first time, choose the full download.

(NOTE: If you plan to use Netscape Communicator as your primary browser and conduct online commerce, you may wish to select the strong (128-bit) encryption option, which provides features that support the highest level of security for financial transactions. If you are downloading Communicator only to gain access to Composer, choose standard encryption.)

If you choose the full download, note where your computer saves the file Cc32e473.exe. After the download, navigate to that folder and double-click the file. Follow the prompts for automatic installation. Allow the program to install either an icon on your Desktop or a shortcut in the Programs menu for easy access to the program. During the process, the wizard will ask if you want Netscape Navigator to become your default (primary) browser. If you are using Microsoft Internet Explorer and want to keep it as your primary browser, you'll need to instruct the wizard *not* to change your default browser.

The program is big—as much as 18MB (megabytes), depending on which encryption option you choose. If you have problems with the download or don't want to wait for the lengthy download, you can order a CD for $5.95 from this site.

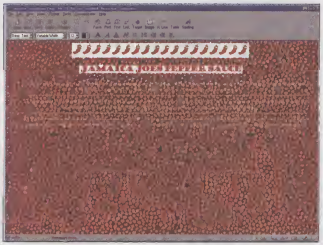


Figure 1. Using complex backgrounds in your Web site can make text difficult to read. It also causes problems with oddly shaped graphics, which by default will have a white background.

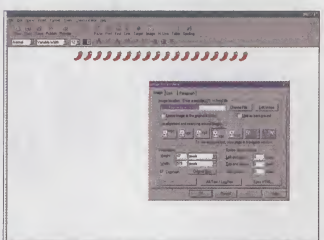


Figure 2. Use the Image Properties dialog box to specify an image's alignment, dimensions, and more.

Lay A Foundation.

Now that we've installed Communicator, we're ready to start building our site. Creating a Web site is like constructing a building; it's a lot easier with a blueprint and a firm foundation. Hopefully, you already have a good idea of what your site should look like, including what elements (text, clip art, and photographs) you'll use and how you'll arrange them.

The site we're going to design is the retail Web presence for an imaginary startup food company, Jamaica Joes Pepper Sauce. The first page we'll build (and the one covered in this article) is the home page.

Before we began, we did some cruising around the Web and used the print feature in our browser to create printed copies of some sites we liked. We also got our graphic elements together. For more information on finding and preparing graphics for Web use, see the sidebar "Web Site Graphics."

Then, we jotted down some information that we wanted to provide on the site: a history of the product, bullets relating to the recipe, an offer for free sauce, links to other Web sites, and a Contact Us link. We also sketched a basic layout of how our initial page should look.

You'll probably find it helpful if you put together some sort of plan, as we did, although you may end up adding and changing elements as you go along. If anything, pulling some ideas together before you start makes that blank page in Composer look a lot less intimidating.

Before we dig in, here are a couple of notes on text preparation:

1. Many people are less concerned about how their text reads than how it looks. It is amazing how many Web sites are littered with misspelled words, poor punctuation, and even missing entire words and sentences. Read your text carefully for grammar and spell check it.
2. After you post your site, open it on someone else's system to make sure that special characters such as dashes and quotation marks converted properly. It's embarrassing for you and confusing to the reader when "John Morgan - Director of Sales" "reads John Morgan hp&sp Director of Sales" instead.

Are you ready? Let's get going!

■ **Off & Running.** To access Composer, double-click the Netscape Communicator icon (or navigate to the program under the Programs submenu on the Start menu) and open the program. Composer is not a standalone product; it exists as a feature within Communicator. If you did not choose Navigator as your default browser, you'll be prompted to do so again. Say no (unless you've changed your mind) and check the box to prevent the option from returning, or you'll see the same screen every time you start Communicator.

If you are not connected to the Internet, Communicator will prompt you to dial up. Choose no if you wish, as an Internet connection is necessary only for Web-site upload (which will take place later), not for Web-page construction.

To open Composer, you can click the Composer icon in the navigational window that pops up when Communicator starts, or you can open the Communicator drop-down menu from the main menu bar (top of the window) and select Composer. A new window will open. This is the blank canvas for your creation.

■ **Create A Home.** The page we'll create will be the home page for Jamaica Joes Pepper Sauce. We'll need to give our page a title, an author, and a description and supply any keywords we want search engines to use. To provide this information, right-click the page, select Page Properties, and then click the General tab and enter the desired information in the appropriate dialog boxes.

The other two tabs for this option are Colors And Background and META Tags. We discuss the Colors And Background feature below. META Tags provides more information about your site; you'll use it only if your Web-hosting company instructs you to do so. (The title, author, and keywords we discuss below are examples of Meta tags. Composer will automatically generate these.)

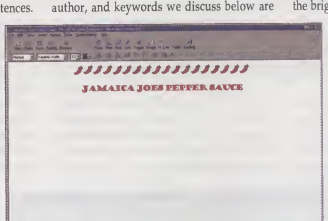


Figure 3. Once we've specified a border and headline for the Web page, we're ready to add text.

For the description, type **The world's greatest spicy hot pepper sauce with all natural ingredients**. For keywords on our site, we'll use terms such as pepper, sauce, bottle, natural, fruit, mango, papaya, food, spicy, hot, and Jamaica Joe. When you create your keywords, try to think of every word that someone looking for your page might possibly use. It's OK to have duplication between your description and keywords; the important thing is to not leave anything out. When you're satisfied, click OK.

We should note that if you aren't trying to attract visitors to your site and plan to give your Web address out to all your friends and relatives, then don't worry about filling in this section. You also won't need to fill in a classification. (We didn't.) It isn't necessary and is mainly used by search optimization services to improve search engine rankings.

The operation we've just completed gives our page a title, but it does not name our actual file. Now that we have provided some information, let's save the file itself by selecting Save As from the File menu (or pressing CTRL-S). Call this file Home Page and be sure to save it to a specific folder and make note of the folder. It's important to frequently save your Web site. We'll remind you several times.

■ **Backgrounds & Borders.** Now that our page has a name and a home, we can begin adding page elements, starting with the background. We are going to use a background color of white, which is the default color in Composer, because we like the way the bright green and red of the peppers shows up against the crisp white background. In the next several paragraphs, we've provided instructions for those that wish to alter their background color or learn more about the features of the Colors And Background Properties dialog box.

For your page, you can choose any color you like for the background; you can also specify a background pattern. Be aware, however, that patterns are graphics files that a viewer's browser must load, thereby adding download time to a page. This is especially true of large photographs (typically JPEG files, or files saved in the Joint Photographic Experts Group format) used for the background.

In addition, complex patterns and pictures can make text difficult to read, and you'll have to save your clip art in a special way to avoid having white bounding boxes show up around any artwork you place. You can avoid this problem if you save your clip art (typically saved as a GIF file [Graphics Interchange Format]) with a transitional color, similar to the background color, but you'll need a good image-editing program to do this. See Figure 1 for an example.

To select a solid background color other than white, right-click the background and select Page Properties. Click the second tab, Colors And Background. This is also where you'll alter the colors used for text. We are using Netscape's default scheme for our Web site, although we may change that later.

At the top of the window is a checkbox Use Viewer's Browser Colors. Make sure this box is not checked. The viewer's browser determines much of how your Web page displays, including background and text colors, unless you specify those elements. By default, Composer will override other browsers to specify the color combinations you select as long as this box is not checked.

To change the background or text colors, click the button to the left of the named item (Normal Text, Link Text, and so on) and either choose from the resulting color palette or click Other to bring up an even wider selection of colors. Play with the Color schemes option to view Netscape's various built-in color schemes.

To add a background image or pattern, click Use Image, then click Choose File and navigate to the graphic. Whatever file you choose tiles to fill the entire screen. Make sure Leave Image At The Original Location is not checked. This ensures that Composer will copy the image to the same folder in which the Web page is located, which will help ensure a clean upload of the Web page and its related files.

If you plan to design a series of pages using the same color scheme, click Save These Settings For New Pages. Composer will save the new combination and apply it to all new pages until you change it. Click Apply to view the changes before you close the window. If you like the background, click OK. If not, change the background color again. (Clicking Cancel after you have clicked Apply does not cancel the change.)

You can always change your selection at any time during the design process. The easiest way to bring up the Page Properties dialog box is to right-click anywhere on your page where there is no text or graphics and choose Page Properties from the resulting shortcut menu. Then choose the Colors And Background tab.

Save your Web site by clicking File, Save or pressing CTRL-S.

Let's Get Visual. Our next step is to begin adding graphics to the page. In our sketch, we decided to put a row of peppers at the top of this (and every) page, so we will drop in that graphic first. To do this, click the top of the page, then click the Image button on the Composition toolbar. Once the Image Properties dialog box opens, click the Image tab and then click Choose File. Navigate to the folder in which you store your images, select the image, which in our case is Joes Pepper Line Small, and click Open.

(NOTE: The button next to Choose File, Edit Image, opens a helper application that lets you perform image-editing functions. If you haven't specified a helper application in Composer General Preferences, it will be grayed out [unavailable]. There are no image-editing capabilities built into Composer.)

After choosing the graphic, we'll tell Composer how to manage it. The first thing we'll do is ensure that the checkbox Leave Image At Original Location is unchecked. (Those of you who read the section on altering backgrounds will recognize this box.) When you leave this box unchecked, Composer makes a copy of the graphic and stores it with the Web page file, which will make our upload much easier and foolproof.

We'll also leave Use As Background unchecked. This would cause the graphic to become the page background and registered in the Page Properties box mentioned above. For now, we'll ignore the next row of buttons, located in the center of the window, which control how text displays adjacent to a graphic. (In this case, since the image stands alone at the top of the page, there will be no need for text to wrap around it.)

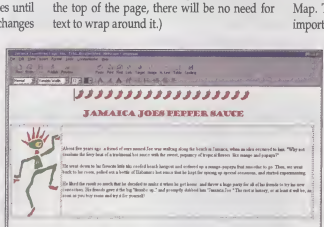


Figure 4. Here we've added a table with a graphic and text. Column width can automatically adjust to fit text and graphics.

The next option, Dimensions, lets us specify a different size for our graphic. Since we originally sized our graphic to the right dimension and number of pixels per inch, we won't need to modify this. If you want, you can resize the graphic, either specifying a certain pixel width or percentage of the page. Avoid using this technique to enlarge a graphic, however, because it causes the image to appear fuzzy and ragged. If you resize your image later, first make sure to check Constrain. This lets you change only one dimension—width or height—with Composer automatically filling in the appropriate number in the other dimension.

If we later want to resize the image, we could also do so by clicking the image, then moving the mouse over the bounding box that appears around it, clicking the arrows that appear, and moving them in and out. If we wanted to maintain the graphic's proportions, we would drag only the corner arrows; the constrain feature does not work for images resized in this fashion.

Next, we'll move to the Space Around Image option. This is how we'll determine how much, if any, white space we want above and below or on either side of the graphic and whether we want any border around it. We want ours to be at the top of the page, so we'll leave the pixel spacing set to 0. We don't want a border around our line of peppers, so we'll also leave Solid Border set to 0.

The final row of options contains one feature that is normally grayed out—Remove Image Map. This feature will only appear if you are importing an image with embedded links to different locations within the same image. Most simple clip art does not contain image maps; they're generally used by illustration programs when creating complex artwork files. If our image did contain these links, this option would remove them, as they would no longer be required.

The next feature on this row, Alt. Text/LowRes, is one of the most important options you can select for ensuring widespread compatibility of your pages. It lets you enter text that will appear before an image loads and will display for site visitors that have text-only browsers or have turned off their image display. It also lets you select an alternate, low-resolution image to display while large files are loading.

Click the Alt. Text/LowRes button. Since we'll use only small files in this site, we won't need to select a low-resolution alternate, but we will want to ensure that all site visitors know what images we've provided, even if they can't view them. For the current image, we'll enter the text "Jamaica Joes Pepper Border Art Small" in the Alternate Text area. Click OK.

We added the descriptive term "small" to the text for a specific reason. Sometimes, Web users with slow modems turn off graphics to speed up their browsing experience. By giving the graphic a name and calling it small (which it is), we're cluing these visitors in on not only about what the graphic represents, but also to the fact that if they decide to turn images back on for this site, the graphics won't take a long time to load.

The final option in the Image Properties dialog box, Extra HTML, is for advanced users who are familiar with HTML and want to add special attributes, such as sounds, to load with the image. To use this option, you'll need to

learn how to use HTML codes, which we don't want to do for now.

There are two additional tabs in the Insert Image window: Link and Paragraph. Link lets you assign a link (a Web address) to a graphic, which we will not require for this graphic.

The Paragraph window lets you assign the properties used in paragraphs of text (such as spacing before and after) to your graphic. This can be difficult to undo, and we recommend using the Space Around Image option instead. This dialog box also lets you choose the alignment for your graphic (left, right, or center). Alternately, you can select paragraph alignment from the second row of buttons on the Composer toolbar. For this graphic, we'll choose Center alignment.

Now that we've selected all the options for our pepper line art, we'll click Apply to see how our newly placed graphic looks (see Figure 2). If you're satisfied, click Close. Now we can move on to the headline of our Web page.

Save your Web site by clicking File, Save.

■ **The Head Of The Class.** Many Web sites use standard text for the headings, but for our site, we'll use the graphic we created for the headline (as mentioned above). We'll insert it using the same process we used for our border, and since it also runs the width of the page, we won't have to worry about runaround. We do want to set it apart from both the line of peppers above it and the text beneath it, so we'll set the Top And Bottom Space around the image to 12 pixels (1/6 inch). With the border and headline in place (see Figure 3), we're ready to add text.

If you don't want to create a specialized heading graphic, you can simply key in your text and choose a heading style from the Paragraph Style drop-down box on the Formatting Toolbar (if it's not available, click View, Show, Formatting Toolbar). Composer will let you format your text using any font on your system, but you'll be safer if you stick with standard fonts, such as Times New Roman and Arial, which are found on all personal computers, whether they are Windows or Macintosh based. Composer's default font is Times; stick with it and the default styles used in Composer if you want to be safe.

Now save your Web site.

■ **Get The Word Out.** Now that we've placed the headline, it's time to tell people something about Jamaica Joe and his sauce. We have a few paragraphs of text talking about Joe and the history of the product, plus a few bullets describing his delicious sauce.

We wanted to combine the descriptive text with clip art we found that reminded us of Joe, but we want the bulleted items to stand by themselves, running all the way across the page. Because of this we'll handle the two groups of text separately.

There are two ways to format words in Composer—as normal text or as tables. Remember the runaround options we mentioned earlier in the Image Properties box? Those control how a line of text flows around a graphic, either at the top, middle, or bottom of it. But HTML doesn't handle true runarounds well where a block of text wraps, line-by-line, next to a graphic.

Composer gets around this limitation quite handily with its Tables feature, which is how you should place any text and adjacent graphics. If text exists on a line by itself, as our bullets will, tables are unnecessary.

To create our table, which will contain both the graphic and the adjacent text, click the Table button in the Composer toolbar. Select the number of rows (1) and columns (2) that we'll use. Then set the table alignment (where it will appear on the page), which in this case is Center.

We won't put a caption for the table or a border around it, so leave Include Caption unchecked and change the Border Line Width to 0. If you have multiple images, you could even alternate images and text in checkerboard fashion by setting up a table with two or more rows.

Cell Spacing and Cell Padding, which determine the space between rows and columns and between the items and the borders of the table cells themselves, won't matter here, since we aren't using cell borders.

Set the table width to 100% (the full width of the Web page), although you may want to adjust that later. Ignore the Table Min. Height, which you would only use if you needed the table to be a certain height, no matter how much space the copy and images took up.

Now uncheck the Equal Column Widths box so that the column width will adjust automatically to fit the images and text. We don't want to set a background image or color, and we don't have any extra HTML coding to add, so ignore the last few options and click OK.

Our table will appear in the Web page, with dotted lines around it that will not show up when we view it in a browser. We can now click the left column and insert the graphic, in our case it's called Joe.gif, using the Image button on the toolbar. Then drop the copy in by cutting it from a word processing file and pasting it into the right column. The Web page should look similar to the one in Figure 4.

(*NOTE: You can add or delete rows and columns later if you wish by positioning the cursor where you want to change the table configuration, clicking*

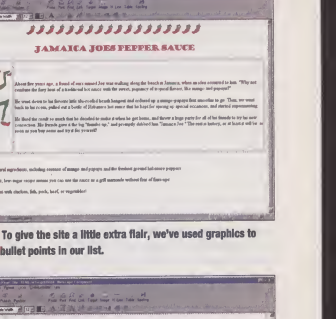


Figure 5. To give the site a little extra flair, we've used graphics to serve as bullet points in our list.

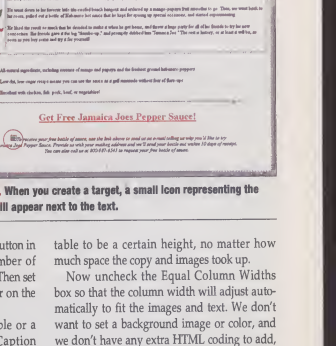


Figure 6. When you create a target, a small icon representing the target will appear next to the text.

the right mouse button, and choosing either Insert or Delete from the resulting shortcut menu.)

Now let's insert our bulleted text, which is really easy to do. We'll just cut the text from the word processing file in which we created it, click in the space below the table, and paste the text in place. You can then add bullets or numbers by using the automated list buttons on the Formatting Toolbar, but we'd rather use the smallest pepper graphic we created earlier. Since these bulleted list items don't need to wrap around a large graphic, we won't need a table. We'll simply insert the graphic at the front of the first line of text, then copy and paste it in place for each additional line of bullet text.

Add a little space between each bulleted item and between the pepper bullet and its text using the Space Around Image option in the Image Properties box, which you can open by double-clicking the graphic. For this example, set the spacing, both Top And Bottom and Left And Right, to six pixels.

Also set the text positioning, as mentioned earlier, by choosing the Text Alignment And Wrapping Around Images option to center the text with the bullet. Now use the indent and alignment buttons on the Formatting Toolbar to set the bullet alignment to left, with a slight indent, as in Figure 5.

To separate the text area from the ordering and contact information that will come next, add a horizontal line. To do this, position your cursor (click) at the end of the last list item and click the H.Line button on the Composition Toolbar. A thin, plain line will appear beneath the text. If you want to change the line's properties, such as thickness and width, you can right-click it and select Horizontal Line Properties.

Save the site by clicking File, Save.

■ **Making Contact.** We're almost finished with our home page, which will serve as the template for all the others. Now we need to make contact with our Web site visitors. First, we want to make an offer of free sauce that will encourage site visitors to try Joe's product, thereby giving him a way of contacting them with new information.

We also want to enhance the value of the page to our visitors by providing links to a couple of interesting pepper information sites we've found during the course of our browsing. We'll also need to incorporate an e-mail order/contact form, copyright information, a logo, and non-Internet contact information for the company.

The free sauce offer we've devised will provide them with a bottle of sauce in exchange for an e-mail message detailing why they want the sauce. To set this up, click the area just below the informational bullets and click the alignment button on the toolbar, choosing center alignment. Type the words **Get Free Jamaica Joes Pepper Sauce** (or whatever text you want) and then highlight the text, making it larger and changing its color to red by selecting Heading 1 in the drop-down Paragraph

A Quick Tour

Before you begin working with Composer, take a moment to familiarize yourself with the layout of its features. Across the top of the window, moving from right to left, are eight drop-down menus: File, Edit, View, Insert, Format, Tools, Communicator, and Help.

File. The File menu is similar to those found in other Windows programs. It handles opening, closing, saving, and printing files. In Composer, it also handles publishing to the Web.

Edit. The Edit menu is your choice for selecting, cutting, pasting, copying, moving, and finding items; it is also where the Preferences (program settings) and view (but not edit) HTML Source options are located.

View. The View menu controls whether you view images and toolbars; it is also where you'll find the Reload and Refresh options. (These cause the program to redraw your window.) Most importantly, the View menu holds the Properties option. Depending on what item is selected, available options will include Page Colors And Properties, Image Properties, and/or Character Properties. The settings for your page and its elements are all in these important dialog boxes.

Insert. The Insert menu is the one from which page elements, such as lines, images, targets (links to other pages), and tables are inserted into your page.

Format. The F'ormat menu controls the format—the general appearance—of your text and tables, including such variables as font style, size, and color.

Tools. The Tools menu offers spell check, table creation, and special-character insertion features, as well as the HTML editing option.

Communicator. The Communicator menu is the main navigational menu for Communicator. It is in all of Netscape Communicator's components.

Help. The last menu, Help, is the starting point for help on a variety of topics, including Composer help. Keep in mind the Composer help files are nested inside the overall help document for Communicator, which can sometimes make finding help a bit difficult.

Composition & Formatting Toolbars

The toolbar that runs across the window just below the menu bar offers shortcuts to several options: New, Open, Save, Publish, and Preview (Web pages); Cut, Copy, or Paste (Web page elements); Print (the open page); Find (text); (insert) Link, Target, Image, H.Line, or Table; and (perform) Spelling (check).

Beneath that row is a second row of menus and buttons similar to those found in word-processing programs. This is the Formatting Toolbar. The three drop-down menus control type style, font, size, and color. The next three buttons apply text attributes such as bold, italic, and underline while the fourth reverts the text back to no style. The next two buttons create bulleted or numbered lists from text while the two after that increase and decrease text indents. The final button handles alignment of text and graphics: left, right, or centered.

Shortcuts to the Properties (Page, Image, and Character) dialog boxes, as well as for the create or insert link and cut, copy, or paste operations, appear if you right-click the Web page with your mouse.

The shortcut buttons and menus in Composer are so comprehensive that you can create a Web page without ever using a drop-down menu. In our examples, we've chosen the fastest way to access the various operations described, which is often by using the toolbar shortcuts. You can also use the drop-down menus if you prefer. □

Style menu and then choosing the color from the drop-down color menu, both of which are on the Formatting Toolbar.

Next, we'll type information on getting the free bottle of sauce, which will read, "To receive your free bottle of sauce, use the link above to send us an e-mail telling us why you'd like to try Jamaica Joes Pepper Sauce. Provide us with your mailing address and we'll send your bottle out within 10 days of receipt. You can also call us at (800) 987-6543 to request your free bottle of sauce."

We'll eventually want to reposition this text immediately below the e-mail link, which will separate it from the offer. Since we want visitors to be able to jump from the offer to the information regarding the e-mail, we'll create a special type of link, called a **target**, that will take them to the area of the page that defines the offer.

To create the target, select the paragraph we just typed, beginning with "To receive your free bottle . . ." and click the Target button on the Composition Toolbar. The Target Properties dialog box will appear. Type the words Free Sauce as the target name.

Click OK, and the box will close and a small icon representing a target will appear next to the text, as in Figure 6. This icon will not appear when you view the page in Navigator or any other Web browser. Now, we need to link our target to the original free sauce offer.

We'll return to the "Get Free . . ." headline, select it, and then click the Link button on the toolbar. Leave the Link To section blank, ensuring that Current Page is checked under Show Targets In.

Our newly created target, Free Sauce, will appear in the Select A Named Target . . . area. Click that target and then click OK. (Ignore the Character and Paragraph tabs, which designers use format the text of a link, because it's easier to use the main toolbar to do this.) Now, whenever a visitor clicks the Free Sauce offer, they'll go to the information on how to redeem it.

Targets are wonderful conventions—they let us set up Web pages so visitors can jump around with ease; they are also how the "return to top" features on many Web pages work.

You also can link targets to external Web pages other than the one on which the target resides. If we wanted visitors to jump to a point on a pricing page, for example, we could create a target and enter its page location in the Link To section, choosing the Selected File option.

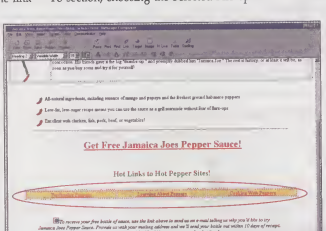


Figure 7. It's easy to use Composer to add links to other Web sites. Simply add the site's title, then link it to the Web site's URL (universal resource locator).

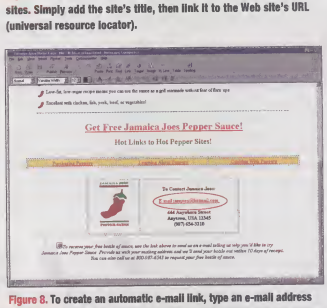


Figure 8. To create an automatic e-mail link, type an e-mail address as a line on the Web page, highlight the text, and click the Link button on the Composition Toolbar.

The targets we created would appear for selection, and after we selected one and saved it, the new link would transport visitors from one page to a specific point on another page.

If you plan to use many graphics on your Web site, you can use targets to link small "thumbnail" images of the graphics to other Web pages containing the actual photographs, so that visitors who don't want to view the high-resolution image won't have to do so.

Now that we've discussed the beauty of targets, it's time to finish our page by setting up our external links to other pepper sites that provide pepper information, pepper recipes, and pepper seed and plants. Place the table between the free offer and its description, remembering that we want the description target at the bottom of the page.

Since we want the three links to run in a row across this space, we'll set them up in a table, as we did with the text and graphic earlier. To do this, position the cursor at the end of the free offer and click the Table button on the toolbar. We'll need three columns and one row, no borders, spacing, and padding. However, since we want our table to stand out, click Use Color under Table Background and click the box adjacent to the checkbox to select a bright yellow color for the table. Click OK.

Once you've entered a descriptive name for the link in each of the three columns, select the links and create a new link for each just as we did for the target. This time, however, we'll enter the actual **URL** (universal resource locator, Web address), such as http://www.peppersarehot.com, in the Link To box, then click OK.

Unlike some Web editors that verify links before they create them, Composer takes for granted that the Web addresses provided for links are correct. This is a great feature, because it means you don't have to connect to the Web to create your links, but it means that you're responsible for the accuracy of the information you enter.

We want our links to stand out against the yellow background and work well with our red-and-green color scheme, so change their color to red using the Page Properties window described earlier. (This will cause *all* links to appear in red, which works for this site.)

To access this window, right-click in a blank area of the Web page and select Page Properties from the shortcut menu. Choose the Colors And Background tab. Then click the button adjacent to Link Text to change its color to red. (To keep things color-coordinated, also change the Active Link and Followed Link colors to shades of green.) Click OK.

Now, to give the links additional dimension, bold them by selecting the text and clicking the

bold attribute button on the toolbar. Then add the words "Hot Links to Hot Pepper Sites" above the links and format them using one of Composer's default styles, as in Figure 7.

Now that our links and targets are complete, we're ready to add our "mailto" feature, which will let customers contact Jamaica Joes via e-mail, plus traditional contact information (address and phone number), a logo, and a copyright notice.

Because we'd like the information to reside next to the logo, create another table, with one row and two columns, to hold the elements. Place it just below the links table and above the free offer description. Once you create it, insert the logo in the left column and enter the contact and copyright information in the right column.

We'll create the mailto link using the standard link feature, taking

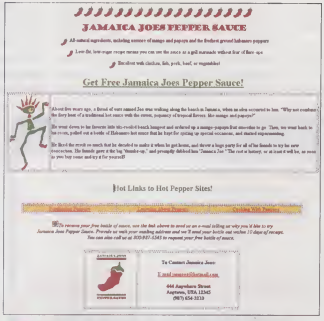

JAMAICA JOES PEPPER SAUCE
All-natural ingredients, including sweeter-of-mango and papaya and the freshest ground habanero pepper
Love fat, low-sugar recipe versus you can use the sauce as a grill marinade without fear of flare-ups
Excellent with chicken, fish, pork, beef, or vegetables!
Get Free Jamaica Joes Pepper Sauce!
Hot Links to Hot Pepper Sites!
To Contact Jamaica Joes:
E-mail: request@hotmail.com
666 Angelsea Street
Angleton, TEX. 12345
(987) 654-3210

Figure 9. After creating the initial site, we made a few changes, including rearranging and editing some of the text and deleting the horizontal rule, as you can see here.

advantage of a command that is available within all standard Web browsers. To create an automatic e-mail link, type an e-mail address as a line on the Web page, highlight the text, and click the Link button on the Composition Toolbar to open the Character Properties dialog box. But instead of a URL in the Link To box, we'll type mailto:jamjoes@hotmail.com, which is Jamaica Joe's address with the term mailto: in front. See Figure 8.

Using this command signals the Web browser of any visitor who clicks that link that it should create an outgoing e-mail message with the provided address as the recipient of the e-mail. Note that there is no space between mail and to, between mailto and the colon, or between the colon and the e-mail address. This exact arrangement is required for the command to execute properly. Click OK.

Web Site Graphics

One of the most important, and frustrating, elements of your Web site can be the graphics. The Web only supports two formats: GIF (Graphics Interchange Format, uses the .GIF extension) and JPEG (Joint Photographic Experts Group, uses the .JPG extension). GIFs are best for cartoon-style clip art with large areas of flat color. JPEGs are best for graphics that have subtle color variations, such as photographs.

If you have access to an image editor, you can convert nearly any graphic to GIF or JPEG format, keeping in mind their respective strengths. If you don't, you may want to download a wonderful, free image converter/editor from Brandyware called The Viewer Pro. Find it at http://members.aol.com/brandyware/viewer.htm.

Because it takes a lot of information to describe the transitions that occur from one color to another, JPEG files tend to be much larger than GIF files. As a result, they are heavily compressed when they are saved. This results in a file that may look small, based on its file size, but is actually quite large when you open it. Large files cause slow download times and can quickly frustrate site visitors. As a result, if you want your Web pages to load quickly, minimize your use of JPEGs and stick with simple, one- or two-color GIF files.

The pepper image we chose for Jamaica Joes' site is a perfect example. It is vibrant and colorful but consists of only two colors. The initial Windows Metafile from our clip-art package was 159KB (kilobytes). Using The Viewer Pro, we converted our clip art to a bit map and sized it to 72dpi (dots per inch), the resolution used for Web graphics.

Then we opened it in Microsoft Paint, a free bit map image editor that comes with Windows. (Paint can be your best friend if you don't have an image editor. It lets you change colors, add text, resize graphics, and perform a wide variety of editing operations.)

Here's a preview of all the graphics we used to create our sample Web site.

We resized the pepper to use it for bullets and buttons, and we duplicated it to create a string of peppers that we could use as a rule. We added text above and below the pepper to create a logo, and because we wanted a specialized look for our headline, we also created artwork for our headline in Paint.

We came across an exotic-looking stick figure that reminded us of Joe, and we used Paint to change the colors to match those of the pepper. We opened and resaved all of these images as GIF files, again using The Viewer Pro.

Many Web experts today recommend that Web pages not be any larger than 50KB and that individual images be 5KB or less. That's less than a small word processing document. By using only two solid colors for our graphics and saving them as GIF files, we were able to create a variety of interesting images, none of which is larger than 5KB. (See the accompanying graphic for artwork examples.)

We've now created our basic home page, which means Jamaica Joes is almost in business. Now is a good time for us to view the page and determine what changes, if any, we wish to make. To do this, click the Preview button on the Composition Toolbar, and the page will open in a separate window in Navigator.

Looking at the site, we decide that we want to move up the free offer and the bullets above the history information (simply highlight the text you want to move, press CTRL-X, then place your cursor where you want to put the text and press CTRL-V). We deleted the horizontal rule by highlighting it and pressing DELETE. We also want to put the details of the free offer above the e-mail address, rather than below, changing the wording as well, as in Figure 9.

Now test the link to the offer details and dial in to the Internet to test the external links. If everything works, you're ready to upload.

Save your site one last time by clicking File, Save.

JAMAICA JOES PEPPER SAUCE
All-natural ingredients, including essence of mango and papaya and the freshest ground habanero peppers
Low-fat, low-sugar recipe means you can use the sauce as a grill marinade without fear of flare-ups
Excellent with chicken, fish, pork, beef, or vegetables!
Get Free Jamaica Joes Pepper Sauce!
About five years ago, a friend of ours named Joe was walking along the beach in Jamaica, when an idea occurred to him. "Why not combine the fiery heat of a traditional hot sauce with the sweet, pungency of tropical flavors, like mango and papaya?"
He went down to his favorite little tiki-roofed beach hangout and ordered up a mango-papaya fruit smoothie to go. Then, we went back to his room, pulled out a bottle of Habanero hot sauce that he kept for spicing up special occasions, and started experimenting.
He liked the result so much that he decided to make it when he got home, and throw a huge party for all of his friends to try his new concoction. His friends gave it the big "thumbs-up," and promptly dubbed him "Jamaica Joe." The rest is history, or at least it will be, as soon as you buy some and try it for yourself!
Hot Links to Hot Pepper Sites!
Previous Page
Learning About Peppers
Cooking With Peppers
To receive your free bottle of sauce, use the link above to send us an e-mail telling us why you'd like to try Jamaica Joes Pepper Sauce. Provide us with your mailing address and we'll send your bottle out within 10 days of receipt. You can also call us at 800-987-6543 to request your free bottle of sauce.
JAMAICA JOES
PEPPER SAUCE
To Contact Jamaica Joes:
E-mail: jaesjoes@hotmail.com
444 Anywhere Street
Anytown, USA 12345
(987) 654-3210

Figure 10. Here's how the final Web page should look when viewed using your browser.

■ **Going Up.** Uploading a Web site is a fairly simple process in Netscape Composer, but before you can do it, you'll need to obtain the path to the Web directory (location), username, and password that will be required for upload. You can get this information from the company that will be hosting the site.

Composer supports both HTTP (Hypertext Transfer Protocol) and FTP (File Transfer Protocol) uploads, which are the two information standards used on the Internet. HTTP supports graphical information, like that found on the Web, while FTP transfers and stores files without a graphical interface.

It's not important that you know the finer points that distinguish the two standards, just which type of location your Web hosting company uses for storing files. The directory address determines that: ftp://anywhere/jamaicajoe/home.html vs. http://anywhere/jamaicajoe/home.html. Confirm the directory path before you begin the upload.

To upload the page, return to the Composer window, where the home page is still open. Click the Publish button on the toolbar. The Web publishing dialog box will open, and Composer will automatically fill in the title and local file location and name you assigned to your Web page.

In the HTTP Or FTP Location To Publish To box, enter the directory location for your home page as provided by your Web hosting company. (Ours was http://wideworld/jamaica-joes/home.html.) This may not be the actual Web address—it's merely the location where the Web page files will be stored on the hosting company's server.

If you will be uploading a series of files to this directory, you can set it up as your default location in the Preferences file, which is on the Edit menu, then just click Use Default Location.

Enter your username and password, click Save Password if you aren't concerned about system security, and make sure to check Files Associated With This Page in the Other Files To Include section. Composer will automatically upload all the associated files, which in our case are graphics, with the Web page, so we don't need to worry about clicking Select None or Select All. If we had not allowed Composer to make copies of our graphics files during the import and moved the files around in our system, we would now have to manually locate them.

We're ready to go. Click OK and wait for the upload to begin. Since we dialed in to the Internet to check our links, we should still be connected. As soon as Composer connects to the hosting company's server and transfers the files, you'll receive a confirmation. The first page is loaded.

You can now view the page in your browser as it appears on the Internet, rather than on your computer. See Figure 10. But we won't really be able to check the integrity of the site until we view it on someone else's system, because we have all the elements on our site already. Even so, we're confident that we've followed the steps necessary to make our first page workable for any Web visitor, anywhere in the world.

When you're ready to build the rest of your site (we plan pages for pricing and ordering, company information, and logo merchandise for our site), you can use the home page as the template, saving it with a new name for each page and modifying it as desired. Then use the link and target features we employed on our home site to connect the Web pages. You also might want to delve into such issues as cross-linking with other Web sites, creating banner advertisements, and even adding discussion groups and shopping cart features (you'll have to learn HTML and manually add these functions). LS

by Jennifer Farwell

Create A Presentation

A Step-By-Step Guide To Designing Your Own Masterpiece

If there's one skill that every aspiring business professional should develop it is the ability to create tasteful and effective presentations with a program such as Microsoft PowerPoint. Gone are the days of standing before conferences and committees with easels or white boards. Even the trusty overhead projectors and transparencies are on their way out. Presentations are now the status quo, and if you want to capture the attention of both clients and colleagues, you'd better learn how to use them.

■ **Before You Begin.** We'll show you how to create a presentation using Microsoft PowerPoint, but keep in mind almost all presentation programs on the market have similar features and functionality. If you can do it in PowerPoint, chances are, with a little searching through a program's Help files, you can do it in a similar presentation program.

Before even opening PowerPoint, you should have in front of you an outline of what you intend to say. This outline of talking points is what you will use as the content for the PowerPoint slides. Then, as you give your presentation, you can, with the click of the mouse or the press of a button, bring the appropriate point up on the screen when you introduce it. No wrestling with flipcharts, no inkless markers or inadequate erasers, and no struggling to conceal the next point on your transparency.

Depending upon the content of your presentation, you may want to consider using graphics to grab and hold the audience's interest. These graphics may be as simple as one of the little clip-art images included with Microsoft Office, or they may be pictures of your product, activity, or business. You'll want to think about what images could be used to supplement your presentation and where you will find them.

Keep in mind that while graphics may be helpful in illustrating concepts, be careful not to overuse them. Also remember that when a small picture projects on a large screen, it is greatly magnified. Viewers will notice poor image quality, so if you know that a picture is low-resolution, think twice about including it in your presentation.

Another type of graphic that works well on PowerPoint slides is the chart, graph, or table. Since presentations quite often involve the explanation of statistics, costs, percentages, and trends, the use of colorful bar graphs, pie charts, and tables can really bring an otherwise boring synopsis to life. Take time to think about where you could incorporate these graphical assistants into your presentation.

■ **Open PowerPoint.** Once you're clear on your content and graphics, you are ready to open PowerPoint and begin creating. Click Start, Programs, Microsoft PowerPoint. If you're not too sure about your presentation-building skills, you may want to enlist the help of the AutoContent Wizard, which offers both creative advice and help with the content outline. Or, if you have your content figured out but aren't sure about the design, try a Design Template as a means of getting your creative juices flowing.

Let's opt for the Blank Presentation route so we can have the maximum amount of creative freedom in designing our slides. Using Blank Presentation, you'll be on your own with both content and colors, but that lets you create a presentation from the ground up. Select Blank Presentation, then click OK. Now let's get started.

■ **Create The Presentation.** In this example, we're going to create a presentation with the goal of persuading vendors to advertise their products on a particular Web site. This fictional Web site—the D-90 Resource—provides a wealth of information for Land Rover owners and four-wheeling enthusiasts, and it would be an ideal place for manufacturers and dealers to publicize their products and services for these vehicles. You can use the text and examples given in the sidebar "The Finished Project" to practice, or you can create your own presentation on whatever you wish.

■ **Slide Master.** To start, you can save some time if you use PowerPoint's Slide Master feature. It controls font characteristics,

Key Points

- PowerPoint includes a number of great tools for making multimedia presentations.
- Create your own presentation with the tips and tools we show you how to use.

such as style, size, and color, as well as background colors, shadowing, bullets, and accent and fill colors. The Slide Master also contains text placeholders for the main text and footers. Develop the slide master with all the characteristics and colors you want to appear on every slide. And, if there's a graphic you want to repeat on each slide, make sure to also add it to the Slide Master.

Click Cancel in the New Slide dialog box, if it appears. Go to the View menu, choose Master, and then select Slide Master to display the blank Slide Master. The first thing is to establish the color scheme by either right-clicking the slide's background (not in a text box) and choosing Slide Color Scheme or choosing Slide Color Scheme from the Format menu.

Within the Color Scheme dialog box, you can select a Color Scheme on the Standard tab. But if you don't like any of the color schemes on the Standard tab, you can create your own look on the Custom tab. Select the color square to the left of each element whose colors you want to change and then click Change Color. This opens a new dialog box, where you can either choose from a wide array of standard colors or create your own colors on the Custom tab. Go ahead and pick a color scheme or set of custom colors you like. When you're finished, click Apply To All.

Creating your own color scheme is fun, but don't abuse the privilege. If you've chosen a different shade for each scheme feature, you've probably gone too far. Remember that while your presentation needs colors and contrast, a virtual rainbow of shades can be annoying. Use colors that compliment the nature of your presentation and use them consistently throughout. Also, think about the contrast between your text and background color; your goal is readability. When in doubt, choose either black text on a light background or white text on a dark background. (Keep in mind some people even find it hard to read white text on dark backgrounds.) Combinations such as red text on a blue background may leave your audience squinting at the screen.

Back on the Slide Master, click the text boxes to choose your fonts. It's easy to use the Font and Font Size drop-down menus on the Formatting toolbar or click Format, Font to pick the sizes and styles you want. You also can use the buttons for Bold, Italic, Underline, or Shadow to add any of those characteristics or the buttons for Align Left, Right, and Center to properly align the text. (*NOTE: If your toolbars don't appear on-screen, select View, Toolbars and make sure there's a check next to the toolbar you want.*)

Let's choose Times New Roman as the font for the body text and Arial (with the bold effect) for the title. Now highlight the standard title text and choose one of the shadow settings from the Shadow button (the one with a shadow) on the Drawing toolbar to give the title text a different look. Choose 60-point text for the title size and 36-point for the main level of body text. Highlight the text in the body text box and, in PowerPoint 2000, choose Bullets And Numbering from the Format menu (in PowerPoint 97, choose Format, Bullet) to assign colors and styles to the bullets we will use on the slides. Assign a color and style, then click OK.

The last feature you'll want to add to the Slide Master is the logo graphic, which we'll want to appear in the upper left of each slide in the presentation. In our example, we opened the Insert menu and chose Picture and then From File to retrieve the graphic from where we'd saved it on our computer. After selecting the graphic, we clicked Insert to place it on the slide. If you don't have a graphic saved to disk, select Insert, Picture, Clip Art. Select a picture you want, then click it and select the Insert Clip button. Close the Insert ClipArt dialog box. Now place your cursor over it and click and drag it into position. We actually had to nudge the title text box down slightly to make room for our logo. Close the Slide Master.

■ **Title Slide.** To add the first slide, click where it indicates. Select Title Slide and click OK. Click in the title box (it says Click To Add Title) and type in your presentation title. Do the same in the subtitle box. (It says Click To Add Subtitle.) After typing the text for the title and subtitle, let's say you realized that it needed to be a little larger than the point sizes you've assigned on the Slide Master. To enlarge the text, select and highlight the text and use the Font Size drop-down menu on the Formatting toolbar to beef

Output Your Presentation

If you thought that standing up in front of an audience and clicking your way through slides was the only means of utilizing a PowerPoint presentation, think again.

Self-running presentation. You can set up presentations to run themselves unattended in such places as booths or kiosks at trade shows or conventions. The presentation recycles each time it finishes, and you can even hide the controls so that others can't tamper with your presentation while you're gone.

Online meeting. Use PowerPoint along with Microsoft NetMeeting to share your presentation with people at other sites in real-time, just as though you were in the same room. (Choose Online Collaboration from the Tools menu.)

Presentation broadcasting. Broadcast your presentation over the Web using an e-mail program, such as Microsoft Outlook, to schedule the broadcast. The presentation saves in HTML (Hypertext Markup Language) format so that your audience can view it through a Web browser. (Choose Online Broadcast from the Slide Show menu.)

Web presentations. Another option is to design your presentation—probably with fewer graphics—for use on the Web. Choose Web Page Preview from the File menu to view it in your browser and then publish it by using the Save As Web Page command.

Overhead transparencies. If you don't have access to a projector, print your slides in either black and white or color onto transparencies and use them the old-fashioned way.

Paper printouts. Help your audience follow along by printing handouts for them (miniature versions of your slides printed two, three, or six per page). You also can print your speaker notes or your presentation outline, including slide titles and main points. Choose Print from the File menu and find these options at the bottom of the Print dialog box. □

Presentation Tools & Tips

Before the day of your presentation, make sure you have all the necessary equipment. A computer (preferably a laptop), a projector, and a projection screen make up the short list of goodies you'll need. Other fun tools, such as a laser pointer for those who don't like fumbling with the mouse pointer or a wireless mouse for those who want to minimize their fumbling, may also be useful.

If you've never given a presentation before, there are two important things you should know about setting up your computer. First of all, turn off the Standby Power Management so that your computer doesn't unexpectedly shut off the monitor or slip into Standby mode when you haven't touched it for a few minutes. Secondly, turn your screen saver off so that your presentation won't risk interruption by Flying Windows, Curves and Colors, or 3-D Flower Boxes. Rectify both problems by right-clicking the Desktop and choosing Properties to open the Display Properties dialog box. Open the Screen Saver tab, disable the screen saver, and then click the Settings button to check the power management status.

PowerPoint also knows you may not be familiar with setting up the projector. Begin by connecting the computer to the projector through the computer's external display port and then open your presentation in PowerPoint. Go to the Slide Show menu and choose Set Up Show. From the ensuing dialog box, click Projector Wizard and let it guide you through the setup process, including identifying the projector, adjusting sound levels, and matching the computer's resolution to the projector. ■

it up. If you aren't satisfied with the positioning of the title and subtitle, move them one at a time by clicking the text and then either click and drag the borders of the text box or use the arrow keys.

Now let's say we want to add a photo to our slide. You can add a photo in the same manner in which you added the graphic earlier. Chances are, when you add the graphic and click Insert, it will appear in the center of the slide, covering much of your text, which, of course, is unacceptable. To fix this, select the picture, go to the Draw menu on the Drawing toolbar, choose Order, and then Send To Back. This returns the text to its rightful position on top of the photo. From there, you can enlarge the picture by clicking and dragging the handles on the selected picture and then nudging both picture and text boxes into perfect alignment.

Before you proceed, save your presentation by clicking File, Save As. Give it a name in the File Name box, then click Save. It's a good idea to save your presentation frequently; we'll remind you to do so after you create each new slide.

■ **Slide Two.** The second slide is a good place to state the objective of our presentation. Our objective was to the point, and we wanted the layout of the slide to be equally straightforward.

Each time you want to add a slide to your presentation, simply choose New Slide from the Insert menu and then select the slide layout that best fits your needs. For our example, let's choose the first slide option because all we need is a title text box for the word Objective and a subtitle box to contain the objective. Type in the desired text just like before. Again, you might need to slightly adjust the positioning of the boxes and enlarge the font sizes.

Save your presentation by clicking File, Save.

■ **Slide Three.** Since this presentation is sales oriented in nature, we need to include a brief list of our audience's objectives and then go on to show how these objectives would be met. Because we want to include some graphic effects in this slide, choose a new slide based on the Title Only AutoLayout.

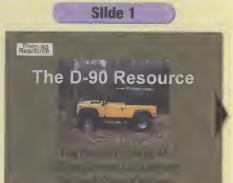
The first step is to enter the title text and then add the three objectives. Because these objectives are Low Cost Advertising, High Visibility To Land Rover Owners, and High Traffic Venue, let's add a graphic to emphasize the obvious low/high theme. PowerPoint's Drawing toolbar includes an AutoShapes menu that's full of ready-made shapes, which you can position, color, and size to taste. Simply click the shape you like and then click the slide. When the shape appears, it has little handles, which you can click and drag to resize. The up and down block arrows seemed an obvious choice for our purposes. To create our example, place and equally size the down arrow and one up arrow and then select the up arrow and use the copy command (CTRL-C) and the paste command (CTRL-V) to create the second up arrow.

To add the text, use the Text Box button on the Drawing toolbar to create three separate text boxes. After clicking the Text Box button, move the mouse back over the slide and position the pointer, which has changed shape, roughly where you want the box. Now click and drag it to the proper size. Upon releasing the mouse, the text box appears, housing a cursor for us to begin typing. Create the first text box and adjust the type size, and then it's only a matter of copying and pasting the box twice and typing the second and third objectives. Now group each text box to each arrow to make them easier to move, should you need to reposition them. (Group items by selecting the first item [text box], holding down the SHIFT key, and selecting the second item [arrow]. With both items selected, go to the Draw menu on the Drawing toolbar and choose Group.)

Now let's add a bold red line beneath the title for a little emphasis. From the Drawing toolbar, select the Line button. The pointer becomes a cross when you move it over the slide, and you can click and drag to extend a line across the slide. With the line selected, use the Line Style and Line Color buttons on the Drawing toolbar to assign the width and shade.

The Finished Project

Slide 1



Now consider how you'll actually present this slide. In our example, we'll want to mention the first objective and discuss it briefly before moving on to the second objective, and so on. Thus, we won't want the distraction of having all three objectives visible when the slide appears. You can find the solution by selecting Custom Animation from the Slide Show menu.

In PowerPoint 2000, in the Custom Animation dialog box, look at the list of slide items and place checks beside the ones you want to animate. (In our case, the three arrow/text groupings—Group 2, Group 3, and Group 4.) Under the Order & Timing tab, verify that the groups are listed in the order in which you want them to appear. Under Start Animation, specify for the animations to start on a mouse click. (In PowerPoint 97, click the items in the Timing tab, then click Animate.) Now go to the Effects tab and tell PowerPoint that you want each item to dissolve onto the slide—no sound effects. With that done, you are ready to watch your handiwork on the miniscreen by clicking the Preview button. If you're satisfied with the results, click OK.

Don't forget to save your presentation.

■ **Slide Four.** For the fourth slide, choose the Bulleted List layout (the one with a title box and bulleted list beneath). Click the title text box to enter the title and then click the body text box to enter each of the four points. The bullets are automatically supplied each time you press ENTER to go down to the next line.

Now let's add the red line we used in the previous slide. Open slide three by clicking View, Slide Sorter and double-clicking the slide. Select the red line, copy it (CTRL-C), return to slide four, and paste it (CTRL-V). Then use the rulers along the borders of the slide to make sure that the line is in exactly the same place on slide four as it is on slide three. (If the rulers aren't visible, click View, Ruler.) You might need to rearrange the title and main text boxes.

Animating the bulleted points so they appear one at a time is even simpler than animating the objects in slide three. All you have to do is select the main text box, go to the Slide Show menu, choose Preset Animation, and then pick the effect you want—in this case, Appear.

Now save your presentation by clicking File, Save.

■ **Slide Five.** For the fifth slide, let's make a bulleted list, too, but we don't want it to look identical to slide four, so let's choose the Text & Clip Art layout (the one with a title text box followed by a bulleted list on the left and a picture on the right). Type in the title text and nudge the box down a tiny bit and then enter the bulleted list text. Enter the text just as you did in slide four. This time the text will appear only on the left half of the slide. (You may need to resize the text.) Now animate the list the same way we did earlier.

The picture box on the right instructs you to double-click it to insert clip art. If you don't want a clip-art image, open the Insert menu and choose Picture, From File as we did before. When the selected photo appears on the slide, it most likely will need resizing, but thanks to the handles, stretching and repositioning is simple.

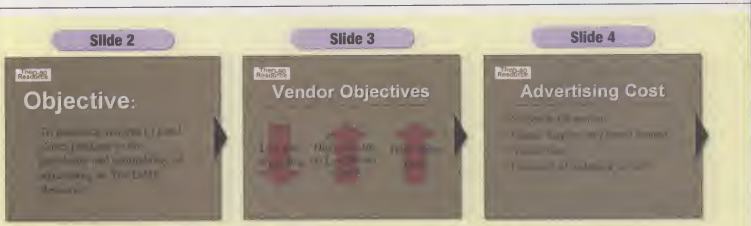
Save your presentation.

■ **Slide Six.** In slide six we'll incorporate a bar chart to show the number of Web site hits per day in the span of an average week. For the slide layout, choose the Chart option with a title text box followed by a chart. After typing the title text, double-click (as PowerPoint tells us) to add the chart. Clicking displays a demo chart with an accompanying datasheet block of cells into which you should enter your own data. As you type the numbers and text into the datasheet, PowerPoint's demo chart transforms itself into your chart, one feature at a time. PowerPoint automatically changes the numbers on the Y-axis of the chart to correspond with the numbers you enter for the chart's bars, and before you know it, the chart is complete. To delete extra rows or columns, simply highlight them and press DELETE.

We'll stick with the columnar bar chart style, which is the default style, because it happens to work well for the content. But, when it comes to charts in PowerPoint, anything is possible. When you have the chart selected and the datasheet open, you will notice that PowerPoint adds two new menus to the top of the screen: Data and Chart. Under the Chart menu, choose Chart Type to open the Chart Type dialog box. Here, you can browse several different standard styles, such as Line, Pie, or Cylinder charts. Each type offers subtype options. Choose a type and then click the Press And Hold To View Sample button to see how your data appears in that type of chart. If you don't find what you like, try the Custom Types tab to experiment with an even wider array of styles. Click OK to implement a style. Close the Datasheet.

Don't forget to save.

■ **Slide Seven.** Slide seven is going to be another chart, so simply copy and paste slide six instead of choosing a new slide and layout. (Choose Slide Sorter from the View menu. In



that view, right-click a slide and choose Copy and then right-click where you want to paste the slide and choose Paste.) Click View, Normal in PowerPoint 2000 or View, Slide in PowerPoint 97. After retyping the title text, double-click the default bar chart to begin editing it.

Let's make a pie chart for this one; choose Chart Type from the Chart menu and proceed to select the best style. Then click OK. The next step is to enter the new numbers and labels into the datasheet, shaping the pie with each new entry. When you're finished, you'll notice that the values for each pie piece did not appear anywhere on the chart or legend. Since the values—together with the shapes—were important, return to the Chart menu, this time choosing Chart Options. In this dialog box, under the Data Labels tab, specify that you want to Show Value. Click OK. Close the Datasheet dialog box and click the slide background.

Now let's animate the chart so that each piece of the pie appears one at a time. To do this, select the chart, open the Slide Show menu, and choose Custom Animation. In the PowerPoint 2000 Custom Animation dialog box, tell PowerPoint that you want only to animate Chart 2. (In PowerPoint 97, click the Timing tab, click Chart 2, then click Animate.) Select the Chart Effects tab and select the option to introduce chart elements By Category and have each piece dissolve onto the screen. After using the Preview button to proof your selections, click OK.

Be sure to save the presentation.

Slide Eight. We'll make slide eight a table instead of a chart, so pick the Table layout, the one that has a title with space for a table beneath. After adding the title and positioning it appropriately, double-click the box below to add the table. In the small Insert Table dialog box, specify the number of columns and rows. In PowerPoint 97, you'll need to make the chart box large enough to hold all the rows.

When the blank table appears on the slide, the cursor automatically blinks in the upper left. After entering the text, if you decide that it looks a little bland, select the entire table by positioning the cursor at one corner and dragging across the table, highlighting each cell. In PowerPoint 2000, right-click the table and choose Borders And Fill to open the Format Table dialog box. In PowerPoint 97, click Format, Borders And Shading. In this box, you can format the style, thickness, and color of the borders; the color of the cells' fill; and the margins and alignment of the individual text boxes.

First change the table's borders; alter their color from black to the same red we used elsewhere and thicken the borders to 3-point width. Apply the selection by clicking each of the borders of the table diagram in the dialog box. Now open the Fill tab to choose a fill color for the table to give it a little contrast from the rest of the slide. Choose a gray shade and then, in PowerPoint 2000, you can select Semitransparent to mute the color even further. Click OK.

We can tell we're on the right track by looking at the slide, but the three column headers across the top row need emphasis. PowerPoint 2000 allows for some additional fine-tuning. This time, select only those three cells and then right-click and choose Borders And Fill. Simply removing the borders by clicking the appropriate boxes in the area on the right side should be enough to make them pop off the slide. Select the cells again and use the Bold button on the Formatting toolbar to make the header text bold. You may need to move the title box and chart or adjust the point size to get the chart and title to fit on the slide.

Save the presentation once again.

Slides Nine & 10. These final two slides are going to be the most difficult to create. We'll use these slides to leave viewers with both a way to contact us *and* with a collage of engaging photos on the screen while we make our closing remarks at the end of the presentation. We'll also automate these slides so that we won't have to click to make each picture appear.

Begin slide nine with a Blank layout, opting to create your own text box. Choose the Text Box button from the Drawing toolbar. Click and drag the box to position near the middle of the slide and stretch it to the proper size. Then enter the text, change the font and font size, and center the text within the box. Now let's say we want a way to access the Web site at the end of the presentation, should audience members be interested in seeing it. Select the Web site name you just typed, right-click the highlighted text, and choose Hyperlink in PowerPoint 2000. In the Insert Hyperlink dialog box, type the Web site's **URL** (universal resource **locator**; Web address) and click OK. In PowerPoint 97, click Slide Show, Action Settings. Click Hyperlink To and choose URL. Type in the URL and click OK. Click OK again.

The picture collage we'll now create is a bit more complex than we originally anticipated, but the end result is well worth the effort. Begin by inserting eight different pictures, either from clip art or those you've saved elsewhere on your computer. Next, select each picture, one at a time, and use the little handles to reposition and resize them. You will notice

that some pictures are overlapped by other pictures or by text. To achieve this effect, simply select a photo, open the Draw menu (on the Drawing toolbar), choose Order, and then select Send To Back or Bring To Front, depending upon what you want to do.

While the collage effect is nice, the slide show will be more interesting and give people a better opportunity to see each individual photo if you animate it, making the photos appear one at a time instead of all at once. To do this, choose Custom Animation from the Slide Show menu. In the dialog box, you can see a miniature of the slide, and in PowerPoint 2000 as you select Picture Frame 1, Picture Frame 2, and so on for animation, the individual pictures are highlighted on the miniature. (In PowerPoint 97, click the Timing tab and Object 2, Object 3, and so on.) That way, you know exactly which graphic goes with each number. Note it on a piece of paper. Our goal is for the pictures to appear, starting with the top center photo and progressing around the circle clockwise.

On the Order & Timing tab in PowerPoint 2000, you'll see each picture you've selected for animation. The problem is that they most likely aren't listed in the order in which you want them to appear. So, comparing the list with the picture numbers you've jotted down, use the arrow buttons to rearrange the listed items into the proper order. In PowerPoint 97's Timing tab, click the Objects and click Animate. Put the objects in the correct order using the arrows next to the Animation Order box.

The next step is to select each Picture Frame listing and tell PowerPoint when to start the animation. Typically, an animation starts on a mouse click, but you don't want to have to click eight times on this slide, so tell it to animate each picture automatically after three seconds.

Keyboard Shortcuts

During your presentation, you won't have those handy menus and buttons to help you navigate from slide to slide. So memorize these keyboard shortcuts ahead of time.

Next Slide	N, ENTER, Spacebar, PAGE DOWN, Right arrow, Down arrow, or click
Previous Slide	P, PAGE UP, Left arrow, Up arrow, or BACKSPACE
Go To Slide (number)	(number)-ENTER
Toggle Black Screen	B
Toggle White Screen	W
Stop Slide Show	S
End Slide Show	ESC
Return To First Slide	Hold both mouse buttons for 2 seconds
Pointer To Pen	CTRL-P (lets you write on the slides)
Pen To Pointer	CTRL-A
Hide Pointer Temporarily	CTRL-H
Hide Pointer Permanently	CTRL-L
Display Shortcut Menu	SHIFT-F10 or right-click
Display List Of Controls	F1

Now open the Effects tab. Again, select each picture listed in the Check To Animate Slide Objects area in PowerPoint 2000 or the Animation Order box in PowerPoint 97 and specify an entry effect for it. Choose Appear for all of them and then check your work with the Preview button. Click OK.

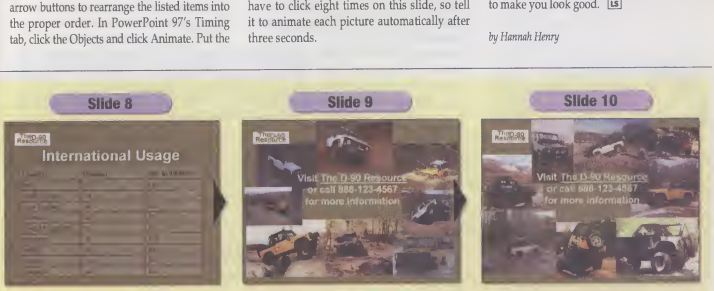
Now choose Slide Transition from the Slide Show menu to automate the transition between slide nine and slide 10 so that you don't have to click to advance the slide. Within the Slide Transition dialog box, tell PowerPoint to advance the slide automatically after three seconds.

Slide 10 will go much faster because you already know what you're doing. Copy slide nine as we did earlier, delete the old pictures, and insert new photos. After arranging them to your liking, proceed to animate them just as we did in slide nine.

Save your presentation one last time by clicking File, Save. Now preview your finished presentation by clicking Slide Show, View Show.

Our advice: Have some fun with PowerPoint next time you are called upon to give a presentation. Using our examples above, you can see how you can create and develop your own award-winning presentation. Learn how to use PowerPoint's many tools and let it work to make you look good. LS

by Hannah Henry



Create A Graphic

PhotoDraw Paints A Thousand Words

Creating great graphics for your print or electronic documents has never been easier. Thanks to the availability of commercial software, novices and graphic designers alike have at their disposal tools to create, edit, and enhance graphics. We'll show you how easy it is to create your own graphics using both a commercial software program and programs you probably already have on your computer. We'll start with a commercial program, Microsoft PhotoDraw.

■ **Microsoft PhotoDraw.** PhotoDraw is an all-in-one graphics program that lets users create professional-looking graphics for both print and electronic documents. PhotoDraw is packed with a powerful set of tools, including more than 20,000 backgrounds, stock photos, edges, and templates. If you're new to graphic designing, don't fret; PhotoDraw comes complete with wizards to walk you through each step of your project.

With PhotoDraw, you can turn simple line drawings into colorful paintings, combine different objects to create a unique picture, add special effects, enhance photos, remove red eye, fix scratches, and much more. You can also scan artwork, download images from a digital camera, or enhance images created in other programs. If you are already familiar with the Microsoft Office menus and toolbars, you'll have no trouble adapting to PhotoDraw's familiar interface.

To see how easy it is to create great graphics in PhotoDraw, let's use a simple clip-art image to create a logo for a fictitious company, Java Joe's (See Figure 1).

1. Open PhotoDraw by clicking Start, Programs and double-clicking Microsoft PhotoDraw.
2. Select Blank Picture and click OK. From this screen, you could also choose your source, such as Template, Scan Picture, etc.
3. The next screen prompts you to select your project type. We'll select Picture, Full Screen. You can also choose Web Page, Label, or Background from this screen. Once you've chosen, click OK.
4. Now we're ready to add our image. We're using an image from Clip Gallery, so we clicked Insert, Clip Art. The Clip Gallery opens, displaying available images arranged by category. We clicked Household and searched for an image we liked, settling on a steaming cup of coffee. Click Insert. If acquiring an image from another source, click File, Scanner, or Digital Camera and proceed as above.
5. Now, the fun begins. PhotoDraw has a number of tools to help you enhance your image. You can use Fill to change the color. Fill has options including Solid Color, Texture, and Picture. In our example, we'll give our cup some pizzazz by adding a textured fill. Figure 1 shows our cup before, with three "after" examples. We enhanced the second and third examples with textured fills. Click Fill and choose which one you want to use. In our examples, we used Modular 1(faded, upper right) and Water 1(faded, lower left).
6. Now let's add depth. For this task, we'll use the Effects tool. Click Effects, and you'll have many choices including Shadow, 3-D and Distortion. In our graphic, we used a combination of Shadow (Drop Right in the upper right and Drop Left in the lower left) and Distortion (Bulge for both examples). You can further distort your image by grabbing hold of one of its sides and dragging it until you get the effect you want.
7. To add text, click Text, Insert. You will have the option of selecting either Designer Text or Formatted Text. We used one of each for

Key Points

- You don't need to be a professional artist to create neat graphics for Web pages or print documents.
- You can use graphics software to create from scratch or "doctor" Clip Art images.
- Don't be afraid to experiment; there are all kinds of tools and effects to help you create graphics.

the first two examples. For the lower-left image, we clicked Format and chose Chiller. For the upper-right image, we clicked Fill, Solid Color, Red to change the text's color. In the lower-left image, we used designer text, which is simply arranged by numbers (1, 2, 3, etc.), and we used Designer Text 7.

8. For the image on the lower right, we decided not to change the color of our original image, but we still added nice effects. We gave it a web effect by clicking Web Effect, Emboss. Next, we clicked Effects, Distort, Bulge to add even more depth. Finally we added formatted text (Text, Format Text, Bradley Hand ITC) and color to it (Fill, Solid Color, Red). We also extended the text slightly off the image by grabbing its end and pulling it until it was the size we wanted.
9. Satisfied with our project, we saved it by clicking File, Save As. You'll want to give your graphic a name and save it in the appropriate folder.

Neat Things You Can Do With Your Web Graphics

One of the neatest things about creating images for the Web is that some programs will also let you animate the images or create rollovers. Animated .GIF files are nonstatic images that move on your Web pages. Rollovers are images that change when you roll your mouse across them. PhotoDraw comes equipped with the tools to create these Web effects and more.

You can also purchase .GIF animation software. A number of inexpensive products are available as **shareware** (software that's free to try; you pay the developer if you decide to keep it). Animagic's GIF Animator (http://www.rtlsoft.com/animagic/index.html) is one such shareware program that you can download from the company's site; it's $29 if you keep it. You can also download a 15-day free trial of Ulead's GIF Animator. Go to http://www.webutilities.com and click the Animation link and then click Ulead GIF Animator. The cost of the full version is $39.95 if you download it, or it's $49.95 for CD-ROMs by mail. ☐

■ **Options Abound.** This is by no means an exhaustive description of everything you can do in PhotoDraw. Use the Cropping tool to combine elements from two or more images to make one. For example, in Figure 2 we cropped together a picture of a skyline and lightning to create a stormy night. To do this, click Insert, ClipArt. Instead of searching by category, we used Search For Clips and typed **night**, which returned many clips to choose from. We found an image we liked and clicked Insert. To change the background, click Crop Size, Cut Out, By Color. Make sure the search mode is set to Global. If the Put In New Picture box is checked under Options, deselect it. Next, hold your mouse and drag a line across the skyline to crop. Click Finish and close the dialog box. Select Fill. You can add any of the fill choices as a background. We selected Picture and tried a number of options (Flames, Red Sky) before settling on Lightning. Simply close the dialog box when satisfied with your image, and you're done.

Pressed for time? Use one of the predesigned templates included in PhotoDraw. Most template projects can be completed in just four easy steps. To use a template, select template and then select your project type, which includes web graphics, theme graphics, cards, and more. After selecting the kind of project, you'll be prompted to select the type of card you want to make. Click the style and follow the easy directions. Click Finish when you're done, and you're set to save or print your project.

You can obtain a 30-day evaluation copy of PhotoDraw for $10, which can be ordered from Microsoft's Web site. The program is included free as part of Microsoft Office 2000 Service Release 1 Premium and Developer Editions.

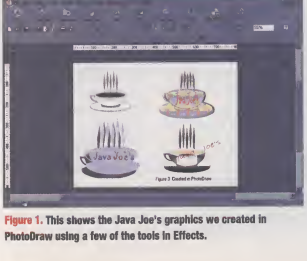


Figure 1. This shows the Java Joe's graphics we created in PhotoDraw using a few of the tools in Effects.

■ **Microsoft Word. AutoShapes.** Microsoft Word comes equipped with a number of tools for creating graphics. For example, AutoShapes includes a series of Lines, Shapes, Block Arrows, Flowcharts, Stars, Banners, and Callouts. Each can be enhanced by adding color, shading, changing the line type, making it 3-D, and more. We used AutoShape to enhance an image of a heart. For our picture, we took a heart, added color and a 3-D setting, tilted left, and added text. We also shot an arrow through it, changing the line depth and ends.

Here's how to use AutoShape:

1) Click Insert, Picture, AutoShapes.
2) Select the AutoShape you want to use and click it to insert it.
3) Your cursor will turn into a crosshair (+). Hold down your mouse and drag it across your document, drawing the object as you go and adjusting its size to fit your needs.
4) Once you have drawn the shape, you can change its attributes (Line Style, Color, etc.) To do so, click Format, AutoShape.
5) Click in the text of your Word document to return to it. If you need to edit the AutoShape later, double-click it.

WordArt. Word also comes equipped with WordArt, a program used to enhance text. You can use WordArt to create logos, banners, headlines, and more. Figure 3 shows samples of the more than two dozen predesigned styles available in WordArt. You can change all of the styles to fit your needs.

To use WordArt:

1) Click Insert, Picture, WordArt.
2) A WordArt Gallery box appears, showing the styles that are available.
3) Select the style you want to use and click OK. An editing box will appear. Type in your text and select the font you want to use. You can also bold or italicize your text.
4) Click OK when you're finished to insert the text into your document.

5) If further editing is necessary, select the WordArt text in your document and double-click it. Change the attributes of the design, such as line or fill colors and letter height, or you can rotate the WordArt text. To format your text, click Format, WordArt from the toolbar.
6) Click anywhere off of the object when you have finished editing it to go back to your Word document.

Clip Art. Finally, Word lets you change the attributes of Clip Art images included in the Clip Gallery and ones you import from another program or download from the Internet. The degree to which you can change the attributes of an image vary according to the object in question. Most will let you do one or more of the following: change the color to grayscale, black and white, or create a watermark; change the line style and type; create a 3-D effect; or create a shadow effect.

To work with an image from the Clip Gallery:
1) Click Insert, Picture, Clip Art.
2) Select the image you want and click OK.
3) You can change the size of the object by dragging its ends until it's the size you want.
4) To change the attributes of the object select Format, Picture. Select the attribute you want to change, such as the sizing, wrapping, or line type, and follow the easy directions.
5) Click OK when finished.

Figure 2. Here we combine two photographs, a skyline and lightning, to come up with the stormy scene in the lower right.

■ **Microsoft Works.** Microsoft Works is a powerful word processing, spreadsheet, and database management suite that comes standard on many new computer systems. It serves as an alternative to Microsoft Office for those individuals who do not want to pay for the expensive suite. The interface of Works is similar to Word, and the program also comes with WordArt .

To use WordArt in Works, click Insert, and then Word Art. An editing box will appear prompting you to type in the text information. You can also change the Text Type, Size, Shading, Shadow Effect, and more. Clicking off of the object inserts it into your document. If you need to format the object further, click the object, then select Format, Picture from the toolbar. Click off the image when finished to insert it into your image.

■ **Microsoft Paint.** Another program that comes standard with the Windows operating system is Microsoft Paint. Paint is a bitmap (a picture made from a series of small dots that form shapes and lines) drawing tool that lets users create drawings using a variety of tools: straight or curved lines, circles, squares, rectangles, and more. Paint also comes with a variety of brushes for adding color to your creations. You can also add text to a Paint object or in the background, as well as enhance objects created in other programs.

Here's how you'll use Paint:
1) Click Start, Programs, Accessories, Paint.
2) To create a drawing, select the appropriate drawing object from the tools on the left.
3) Hold down your mouse and drag the object to the Paint palette, drawing the object and adjusting it to the size you want.
4) To add color to your object, select the Brush, Airbrush, or Fill with color buttons. Select the color you want to use from the color palette and paint the object. Under Image, you can change an image with any of the following options: Attributes, Stretch /Skew, Flip/Rotate, or Draw Opaque.
5) To work with an image from another program, select File, Open. In the Files Of Type field, click the Down arrow and select All Pictures Files. Browse to the location of the image you want to open and click OK.
6) Paint also lets you save an object as wallpaper for your Desktop. To do so, select File, Set As Wallpaper. In Windows 98 (Win98), you can select either **tiled** (image shown repeatedly across the Desktop) or **centered** (one image in the middle of your Desktop). You must save the object before you can set it as wallpaper; click File, Save As.

■ **Kodak Imaging.** Imaging is yet another free program for editing graphics. Imaging lets you either insert scanned objects or open a saved image. You can also use the freehand drawing tools or the shapes that are included with the program.

Follow these easy steps to make and alter images in Kodak Imaging:
1) Click Start, Programs, Accessories, Imaging to open the program.
2) To create a new document from scratch, click File, New, Blank Document.
3) If you plan to draw an object, you can select the freehand tool or one of the predrawn shapes. Click, hold down, and drag your mouse to draw the object. As with most graphics programs, you can change many of the attributes of the image.

Free Graphics For Your Projects

Visit the following sites to find graphics for your Web or print projects.

Webclipart.com:	http://www.webclipart.com
ABC Giant:	http://www.abcgiant.com
Data.Net:	http://www.eclipse.com
CoolGraphics.com:	http://www.coolgraphics.com
AAAClipArt.com:	http://www.aaaclipart.com
A1 ClipArt Archive:	http://www.clipahoy.com
Clipart Freebies:	http://www.clipartfreebies.com
Clip-Art Center:	http://www.clip-art-center.com
Best Animations:	http://bestanimations.com
Web Developers Virtual Library:	http://www.stars.com/Graphics

4) To import an image from another file, click File, Open. (Make sure All Image Files is selected in the Files Of This Type field.) Find and highlight the image you want to insert and click OK. To scan an image, click File, Scan New and follow the directions. Imaging also has an annotation tool that lets you add the text of a file or a rubber stamp message to your project.

■ **Microsoft Photo Editor.** If you have Microsoft Office 97 or the standalone versions of Word 97 or PowerPoint 97 you have yet another graphics enhancing tool, Microsoft Photo Editor. Photo Editor lets you edit scanned photos or images acquired from other graphics programs.

To access Photo Editor, click Start, Programs, Microsoft Photo Editor. Once open, you can either scan an image or open one from File (File, Open, or Scan Image). After selecting your image, you are ready to edit it. With Photo Editor you can crop, resize, rotate, emboss, sharpen the image's colors, remove smudges, and more.

■ **Creating Graphics For The Web.** When creating graphics for the Web, there are a few important things to keep in mind. One of the most important being that there are only two acceptable image formats for displaying graphics: .GIF (Graphics Interchange Format) is generally used for line art or simple drawings, and .JPG (Joint Photographic Experts Group) works best with a photo or an image with complex color gradients. Graphics that have been saved in any other format will not display on your Web pages. However, you can use programs, such as Paint, to save them in a supported format.

Most programs we've discussed follow the same procedure for saving files for the Web: File, Save (or Save As) then select .GIF or .JPG. Imaging saves files in TIFF (Tagged Image File Format) only so it's best not to use Imaging as your editor if you plan to use your graphics for the Web. Images created in Works will have to be cut and pasted into a program, such as Paint (Versions of Win98 or higher) if you want to use these images on the Web. And finally, if you use Word to create your Web pages click File, Save As, and in the File As Type field, click the Down arrow and select Web Page (*.htm, *.html), and click Save. Your images will automatically be saved in an appropriate format.

Image resolution is another important aspect of saving graphics for the Web. A picture's resolution is the clarity of detail of an image produced by a monitor, scanner, digital camera, or printer, to name a few, and is measured in pixels or dots per inch (dpi). When creating images for the Web, you should set the resolution to 96dpi. Setting the resolution higher will not make a higher quality graphic but will instead produce a larger picture file that takes forever to download and won't fit on most monitor screens.

Keeping your image files small (50KB [kilobytes] or less) will help your pages download more quickly. Users get annoyed when they have to wait forever for a huge photo file to download. You can create a smaller version of your image, called a thumbnail, that links to a larger version of the same image, giving viewers the option of opening the larger file if they choose to. To keep your file smaller, you should reduce the colors, and most image editors will have a way of doing this. Start with 256 colors and reduce your image while retaining an acceptable resolution. To change the colors, click Start, Settings, Control Panel and double-click Display. Select the Settings tab and click the Down arrow next to the Colors field to change the color settings. Click Apply, and you'll be prompted to restart your computer for your changes to take effect.

Graphics are an integral part of documents for both print and Web media. If you've ever wanted to create your own graphics for business or personal use but felt you were not artistic or creative enough, giving one of these imaging products a go will put that notion to rest. You'll find it's no trouble at all to create great, eye-catching graphics using commercially purchased software or the software that's bundled with your office suite or operating system. Now that you see how easily it can be done, what are you waiting for? Let's start creating! LS

by Myra Faye Turner

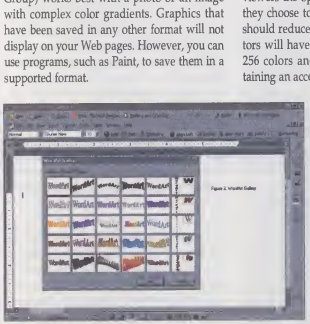


Figure 3. The WordArt Gallery shows what you can do to spruce up a simple word or phrase in Microsoft Word.

Using Graphics In Your Projects

You can use graphics to enhance all types of print and electronic media. Adding a graphic to a print document can help illustrate key points, as well as add variety to your document. For Web pages, some type of graphic is almost mandatory to keep visitors from clicking off. You can use graphics in many other ways, including in:

- Newsletters
- Flyers
- Brochures

You can also create your own personalized letterhead, business cards, and labels. The possibilities are endless.

For More Information

Corel
CorelDraw 9 Office Edition
$249 new user
$169 upgrade
(800) 772-6735
(613) 728-8200
http://www.corel.com

Microsoft
Home Publishing Suite 2000
$54.95
PhotoDraw
$109 ($20 rebate for users of some Microsoft products, including Office 97 or later)
Publisher 2000
$100 ($20 rebate to users of previous versions)
(800) 426-9400
(425) 454-2030
http://www.microsoft.com

Create Flyers & Newsletters

Print Like A Pro For Much Less Dough With Microsoft Publisher 2000

Scan through the job listings, and you'll see signs of our computer-aided times: "Administrative Assistant. Accounting firm has immediate opening. Duties include various administrative support tasks, including coordinating appointments and schedules, handling office correspondence, and using desktop publishing software to create professional-looking flyers and newsletters."

The fact that desktop publishing experience is in demand with employers is one indication of the trend toward professional quality (or nearly professional quality) do-it-yourself publishing.

Until recently a company had two choices when it came to printing jobs: do an amateurish job in-house or pay big bucks to an ad agency for professional quality. Now, many small businesses are choosing a third option made possible by advances in the desktop publishing industry: do it in-house *and* project a professional image. This solution is not limited to small businesses. Because of the demand, a whole industry has grown up around desktop publishing, making it easy and affordable for home office and home use as well.

If you haven't used desktop publishing software recently, you might be surprised at what current publishing applications can achieve. If you'd like to do a little publishing for either home or business use, check it out. You'll find reasonably priced desktop publishing software, specialty paper stock, and quick-print and commercial printing services that support desktop publishing. Who knows, you might even broaden your career options while you're at it.

Key Points

FLYERS

At Home

- Garage sales
- House—or boat, car, treadmill—for sale
- Block party
- Teens' after-prom party

Nonprofit

- Wish list
- Bake sale
- Walk-a-thon

Business

- Customer appreciation day
- Preseason sale
- Coupons
- New product/service

NEWSLETTERS

At Home

- Write up family events, such as reunions, holidays, anniversaries.
- Report on kids' sports teams
- Cover special interests, such as a quilting circle or investment club

Nonprofit

- Update members of group activities, profits, and fund raising efforts.

Business

- Use for marketing products and services.
- Publish service tips, such as "how-to" home repair tips from a hardware store.

■ **First Things.** The first step is to determine the purpose of your publication. For example, a nonprofit organization holding a charity golf tournament might use a promotional flyer that can do double duty. It can be flat for posting on golf course bulletin boards or folded for mass mailing to a purchased list of golfers. A dentist might mail a quarterly newsletter to area residents, combining service topics, such as tips on flossing or cavity prevention, and marketing topics, such as cosmetic whitening procedures or improvements in denture materials.

The second step is to visit several commercial printers or quick-print shops. Ask to see samples of work they've done for other customers. What you'll notice is that commercial printers turn out higher quality, especially when it comes to printing photographs or using color extensively. Quick-print shops do their best work if your design is limited to type, simple graphics, and spot color.

It's also important to talk to them about specifications for preparing your file for printing. Ask what is the best way to provide photographs and ask for advice on choosing paper stock. This is probably not the time to get firm cost estimates. The printer needs to know a number of things about your project beyond quantity and paper stock. Design factors, such as photos, bleeds, number and type of colors, folds, and more will influence the cost.

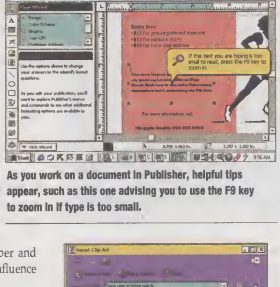
The third step is essential if you're mailing your flyer or newsletter. Mass mailings are eligible for postage discounts but only if they meet the U.S. Postal Service's very strict criteria for preparing mail suitable for automated processing. Before you buy paper stock and design your piece, you need to understand these criteria because they affect paper thickness, size of the piece, address placement, etc. You don't want to learn that your mailing doesn't meet regulations after your piece has been printed and labeled.

If you're outsourcing your mailing to a mail house, your account representative there can advise you. Otherwise, mailing guidelines and templates are available at any U.S. Postal Service Business Center. If there's not a Business Center in your area, visit the Postal Service's Web site (http://new.usps.com). Click the Business tab, and you'll find downloadable documents to guide you. These are in PDF (Portable Document Format), so you'll need Adobe Acrobat software to read them.

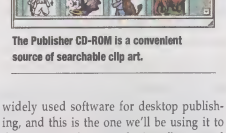
■ **Choose Your Weapon.** If you don't already own desktop publishing software, you'll want to know a little about your options before you commit to buying any. There are many different publishing suites on the market today. We won't give a complete overview of what's available, but here are a few of the publishing applications that we like:

Microsoft Publisher (http://www.microsoft.com/office/publisher). This is the most widely used software for desktop publishing, and this is the one we'll be using it to demonstrate how to design flyers and newsletters in this article. (You can use many of our tips know matter what desktop publishing software you choose.) Publisher 2000, which sells for $99.95, offers new features over Publisher 98 that simplify your design job while improving results. New features include:

- **Full integration with Microsoft Office programs.** If you're familiar with Microsoft Word or Excel, your basic understanding of menus, toolbars, and commands will shorten your learning curve with Publisher.
- **More publication templates and clip art.** There are more than 400 new publication templates, including 10 coordinated Design Sets for holidays, fund-raising, special events and more. Plus, you'll find 16,000 photos and clip art images in the Microsoft Clip Gallery.
- **Quick Publication Wizards.** You can create attractive, one-page documents in minutes.
- **Print-to-Web.** You can put a Publisher-generated document, such as a flyer, on the Web without having to re-create it.
- **Support for printing.** Perhaps the most wanted enhancement to Publisher is that files can be delivered to quick-print shops or commercial printers in formats they can readily work with. You'll get the results you want without extensive and costly pre-press work.



As you work on a document in Publisher, helpful tips appear, such as this one advising you to use the F9 key to zoom in if type is too small.



The Publisher CD-ROM is a convenient source of searchable clip art.

Harvard Publisher (http://www.harvardgraphics.com). Another publishing program to consider is Harvard Publisher. At $69.95, it comes with a whopping 120,000 clip art images and photos, 300 Design Wizards, and 400 TrueType fonts. One of its timesaving features is Intelligent Text Fitting that scales a block of text to fit into a box or column.

Print Shop Deluxe 6.0 (http://www.broderbund.com/store/homeoffice/printshop.html). Broderbund was a pioneer in personal desktop publishing software. Its latest version of Print Shop Deluxe is an inexpensive, easy-to-use program featuring 100,000 graphics and photos, photo and text editors, a Web site designer and more.

■ **Hardware.** Ideally, you can run out and buy the type of equipment that will give you the most professional-looking results. In reality, you may have to work with what you already own, which may not be intended for desktop publishing.

Gurus Only

Business mail is highly specialized, so don't expect a clerk at your post office branch to understand all the ins and outs.

Don't despair. There are ways to get around these limitations.

Printer. If you plan to print your publications yourself, the type of printer you use is an important element. What looks like Cinderella on your screen can morph into an ugly stepsister with the wrong printer. With the availability of colorful specialty papers for your flyers and newsletters, you might find you can create attractive pieces with just black type. For projects using spot color, you'll get the best quality from a color laser printer, which is costlier than an ink-jet printer. If you plan to use a lot of color or incorporate color photos, it's best to go to a commercial printer.

Scanner. A flatbed scanner is an optional accessory. If you don't plan to use a scanner often, or your scanner doesn't have high enough resolution, you can have graphics and photos scanned at a copy shop. You can also just make do with the clip art collection packaged with your desktop publishing software and with art available from Internet sources and other software.

Form & Function

When making flyers with entry forms, remember that the entry form will be torn off the flyer and returned to you. Make sure it isn't the only place that information people will need appears.

■ **Publishing Basics.** Desktop publishing is an adventure that's not without perils. Consider knowledge of frames and objects essential to your survival. Take some time to get to know how they work. A frame is a box around a graphic or text. It's simply a tool for resizing, adding or deleting objects, and positioning objects on a page. The frames you see on your screen disappear when you print your page. An object is a text or graphic inside a frame. If you've ever worked with text boxes in Microsoft Word you understand the principals for manipulating frames and objects in Microsoft Publisher.

When you work with a wizard, you'll see frames already in place. When your mouse pointer hovers over any part of a frame, a little moving van icon appears. Hold your mouse button down and drag the frame. The object (text or graphic) inside the frame moves with the frame. Double-click it, and the frame sprouts little handles at the corners and sides. Let the mouse pointer rest over a handle, and an icon with the word "resize" appears. Now when you drag the frame, it gets bigger or smaller instead of moving. To delete the frame as well as the object, right-click it, then click Delete Object.

Double-clicking the frame has another purpose, as well. It lets you go inside the frame and work with the object. For example, you can center a line of text inside a frame, or highlight text and change the font or point size. You can also replace text.

Sometimes you'll try to put more text in a frame than it can hold. A little overflow symbol will appear. There are several solutions. You can reduce the point size of the text, enlarge the frame, or connect the frame to the next frame. In the Tools menu, click Connect Text Frames. The mouse pointer becomes a pitcher icon. Click inside the next frame to pour the overflowing text into it. Publisher also has an automatic copy-fitting feature, which you can set or turn off by opening the format menu, choosing AutoFit text and making your selection.

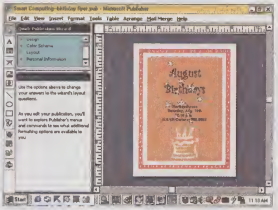
A Snap To feature lets you easily align objects without having to painstakingly move each one. Place your mouse pointer on the ruler, hold the Shift key, and drag the ruler guide to the position you want. Click Snap To Ruler Marks on the Tools menu. Then drag each frame you want to align close to the ruler guide, and it will snap into place.

You can add frames for text, tables, WordArt, pictures and clip art. Click the appropriate icon in the Toolbar on the left side of your screen. Then place your mouse pointer on your page, hold the mouse button and drag the mouse to draw the frame.

■ **Flyers In A Flash.** If you're like a lot of people, you'll buy and install Publisher the day before you need to get a flyer to the printer. Or maybe you're not under a deadline, but you were born with the gene that makes you averse to using instruction manuals. In either case, the flyer wizard is for you.

Assuming that you know your way around the Microsoft family of applications, such as Word, then you already know how to open files, print, save, change font size, etc. If you also know how to use frames and objects, you can literally open Publisher, choose a flyer wizard, and go for it.

Follow along to see how the 10K Run/Walk flyer was created using the Fun Run Flyer Wizard. This flyer is designed with a tear-off entry form at the bottom. It's suitable for mailing to lists and to the media, sending in bulk to runners' clubs, or placing in literature racks at libraries, health clubs, schools and sporting goods stores. It's not suitable for posting because someone will deface it by tearing off the entry form.


Flyer Compelling-birthday flyer.pub - Microsoft Publisher
File Edit View Insert Format Tools Table Arrange Mail Merge Help
Create New Publication Wizard
Color Scheme
Layout
Personal Information
Use the options above to change your answers to the wizard's layout questions.
As you edit your publication, you'll want to explore Publisher's menus and commands to see what additional formatting options are available to you.
August
Birthday
11:10 AM

Create a flyer in 15 minutes using the Birthday Flyer Wizard in Publisher's Quick Publications category.

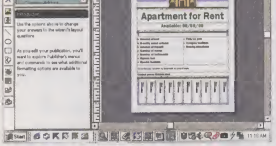
Publisher opens to the Catalog, which lists the categories of wizards on the left side. (Click the Publications by Wizard tab if you're not seeing the categories list.) Choose the flyer category. All the options appear as thumbnails on the right side. Choose Fund-raiser and then Fun Run Flyer. Click Start Wizard. The wizard opens in the frame on the left with an Introduction. You'll see the flyer template in the right frame. The wizard will ask you to make decisions and provide information that will modify the template. As you go through the wizard pages,

you're first asked to choose a color scheme. We changed the color scheme from the default to Tidepool and clicked Next. The next page asks if you want a placeholder for a customer address. We said no, as this flyer will not be a self-mailer. The next page asks if you want to create a Personal Information Set. This is convenient if you're creating a set of documents that use the same name, address, etc. The information you provide becomes a boilerplate that the wizard plugs in to your documents. If you skip this page, you can type in the information on the template later. Click Finish, and you're ready to customize your flyer.

The flyer image you see is reduced, making it impossible to read much of the text. To work with the flyer, enlarge it to about 75%. (Choose View, Zoom, 75%.) As you make changes, go back to the Whole Page view under View, Zoom to see if you like the proportions, spacing, etc.

The flyer template uses dummy text as a guide to all the information you'll want to include in your flyer. You could simply go in and replace the text with your own information and call it a flyer. You can change the name of the run, drop in the name of the charity that will benefit, list prizes and sponsors, put in dates, the course, the contact person and phone number, information about where to send entries, and add the waiver details.

On the other hand, you're not locked into the layout or the elements within it. You can change fonts and type sizes, add or delete graphics, and reposition text or graphics. For example, since the event we're promoting will benefit the Humane Society, we added the dog and cat graphic from Microsoft Clip Art. Click the Clip Art Tool in the Toolbar on the left edge of the screen. (It looks like a cartoon character.) Place the mouse pointer where you want the graphic to go, and then move it to draw a frame. The Insert Clip Art dialog box will appear. Typing "dog cat" in the search window will give you thumbnail images of dog and cat art available in the Clip Gallery. When you find a suitable image, you'll be instructed to retrieve it from the Publisher CD-ROM. Once you've placed it in the frame, you can resize and move it.



This Flyer Wizard in Publisher can be easily customized.

Another major alteration we made to the flyer template was to copy the graphic with the word "Prizes" and use it for two other major headings: "Humane Society Benefit" and "Sponsors." It's as easy as doing a Copy and Paste function in a Word document. After double-clicking the object, you'll see handles on the frame. Right-click, then click Copy. Place your mouse pointer where you want the graphic, then right-click that spot and click Paste. You'll probably have to drag the frame into the correct position. We replaced the word "prizes" with "Humane Society Benefit." Resize the frame and adjust the point size to make the words fit.

We also made a change in content on the entry form. At the bottom right is a place for Waiver information. In its place we inserted "Amount Enclosed $_____."

Hot Off The Press

For a simple announcement that can be done with a graphic or photo and a few phrases, check out the Quick Publication Wizard.

■ **Newsletters Now.** When you create a newsletter, it's usually not just a one-time publication. For that reason, your first issue should set the stage for all the issues to follow. Consistent content, look, and style communicate an image of a solid, trustworthy organization. Choose the name, look, color, paper, and content carefully because you'll want to live with those choices for several years without making major changes.

To give our project some context, we used the Newsletter Wizard to create a four-page (11- by 17-inch) publication for a business called Hanson's Garden Center. The company sends single, folded copies to names on purchased mailing lists in selected ZIP codes and to garden editors and reporters. It also sends multiple unfolded copies to garden clubs and it places unfolded copies in literature racks next to checkout lanes in its garden center.

To begin, open the Publisher Catalog, which lists the categories of wizards on the left side. (Click the Publications By Wizard tab if you're not seeing the categories list.) Choose the newsletter category. From the thumbnail options displayed on the right, we chose the Capsules version. Click Start Wizard after you've made a selection. The wizard opens in the frame on the left with an Introduction and displays the front page template on the right.

Go through the wizard questions, which first ask you to choose a color scheme. We chose Iris for our newsletter. Next the wizard asks if you want one, two, or three columns. We left it at the three-column default. Then it asks if you want a placeholder for a customer address. We said Yes, and the wizard added the placeholder for a mailing label to page four. You can see it by clicking Go To Page in the View menu and typing 4. Alternately, click the page icon numbered 4 at the bottom of the screen. Next the wizard asks if you want to print your newsletter single- or double-sided. We chose double.

The wizard asks you to choose which Personal Information Set you want to use: primary business, secondary business, other organization or home/family. We created a primary business set by clicking Update and filling in information, such as company name, address, and phone number in the dialog box. The wizard will plug this boilerplate into all your primary business documents. For example, the business name we chose, "Hanson's Garden Center" automatically appears in the blue bar at the top of our newsletter's front page. Close the box and click Finish.

You'll want to enlarge the newsletter image to work with it. Many of the same steps

Be A Newsletter Junkie

Ask friends and family to save the newsletters they receive. When you see something worth emulating, call the company and talk to the person responsible for the newsletter. They'll probably be glad to offer you advice once you tell them how great their newsletter is.

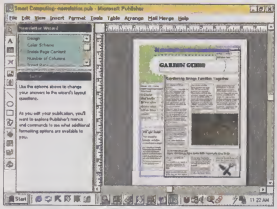
outlined in the section on using a flyer wizard apply to newsletters. What makes laying out a newsletter mechanically different from a flyer is columns of text. The newsletter template uses a separate text frame for each story. You'll see that a frame can encompass more than one column so that text flows from the bottom of the first column to the top of the next. You can resize a text frame to fit your story length. If you copy a story that's too long into the frame, a dialog box will appear asking if you want Publisher to automatically handle the overflow or if you want to connect frames yourself. To do it manually, use the Connect Text Frames option in the Tools menu.

We made our lead story at the top of the front page a service feature: "Gardening Brings Families Together." Our second story is a quasi-marketing piece about award-winning tools that take the pain out of gardening. (Of course, the story tells readers they can buy these great tools at Hanson's.)

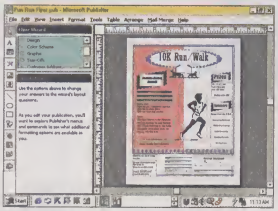
The front page of our newsletter features a stunning photo of a garden. Depending on the newsletter, you might like to use the same photo every time. If you're incorporating a scanned photo, you'll probably need to customize it first using the Photo Editor or PhotoDraw tools in your Publisher 2000 package. Then you'll use the Picture tool in the left-hand toolbar to create a frame where you'll insert the photo.

Our newsletter combines marketing and service messages, so we inserted a coupon on page three that entices people to open the newsletter. It's on the back of the address area on page four so that when it's torn out it doesn't ruin an article. Including coupons can be a helpful marketing technique that can let a company build a database of shoppers who redeem coupons.

To work with the inside pages, click Go to page in the View menu and type 2 or click the icon numbered 2 at the bottom of your screen. Click Inside Page Content in the wizard, and you'll be given several page layout options for your inside spread.



The Garden Guide newsletter was created using the Capsule Newsletter Wizard in Publisher.



The Run/Walk flyer was created using the Fun Run Flyer Wizard in Publisher.

The inside and back pages use a good newsletter strategy in which several regular departments always appear in the same position. This is not only useful in helping regular readers find the features they like, but it also helps you plan content for each issue. With a standard layout, you'll have a much better idea of how many stories you'll need and what length you'll need each of them to be.

The Pest Patrol and Weed Watch departments in our gardening newsletter alert readers to seasonal problems they can expect in their lawns and gardens.The features also mention that Hanson's had the products necessary to control these problems, of course.

Urban Splendor is another department we created in our newsletter. This section shows readers how they can use container gardens, hanging plants, and other methods to beautify a tiny apartment deck or patio. Then there's a Q & A department where owner Sylvia Hanson answers readers' questions. Finally, the back page has two departments: a To-Do List that advises readers on when to plant and when to fertilize, and Community Events, which announces garden club meetings, garden walks, and flower shows. Regular sections make designing a layout much easier, but be sure to leave room in your newsletter for stories that don't fit into department categories.

■ Purple Prose & Other Gaffes.

As a newsletter publisher, you must always ask yourself, "What's in this for readers?" The answer will guide your choice of content. But it takes much more than compelling content to hold them.

Readability is one of those subtle things that have great impact on whether you're newsletter becomes popular or just fizzles out. Your message doesn't stand a chance if people can't read it or have to work too hard to read it. Here are a few tips to make your newsletter easy on the eyes and more appealing to potential readers:

1. Choose a paper stock with a matte finish as opposed to a high gloss stock. The glare from high gloss paper makes it uninviting to look at for very long. Also, avoid paper stock that has too much texture or pattern that can fight with the type.

2. Text needs breathing room. Break up big blocks of text with subheads.
3. Serif type fonts—the ones with little extensions on the ends of letters—are more readable than sans serif fonts. A pleasing combination is to use a sans serif font, such as Arial, for headlines and subheads and a serif font, such as Times New Roman, for body type.
4. The standard type size for newsletters is 10 point. Consider using larger type if the newsletter's readers are older adults.
5. Use reverse type sparingly. Ever try to read a paragraph or two when the words are printed in white on a black background? It's tiring. But when reverse type is used sparingly, it's a great eye magnet. Use it along the side to call attention to a bulleted list of five or six products or in a small box to announce what's coming in the next issue. (Study the Yellow Pages of your phone book to see how reverse type catches the eye.)
6. Use capital letters sparingly. Don't put long lines of text or even headlines in all caps. Use a mix of upper and lower case letters.

■ **Prepare To Print. Home or office printer.** If you're printing in black and white, and your publication has color photos, there's a Recolor Picture command in the Format menu that will improve appearance. If you're printing in color, you'll want to compare the color scheme on your screen with the printed results. On the Format menu, click Color Scheme, click Standard tab, and click Print Color Sampler. If you don't like what you see, consult the Print Troubleshooter in the Help menu. **Quick printing or commerical printing.** When you talked with your printer, you determined what type of color printing was appropriate for your publication and learned which printer driver to use. In many cases, you'll choose from a driver already installed with Publisher. In other cases, the printing service will provide the printer driver on a disk or direct you to a Web site from which you can download it. To install the new driver, use the Add Printer wizard in the Printers folder of My Computer.

Set up your publication for spot or process (four-color) printing using the Commercial Printing Tools option in the Tools menu. If your printing service is equipped to use Publisher, you'll prepare your file using the Pack and Go Wizard in the file menu. If not, you'll need to save your work as an Adobe PostScript file, selecting a printer driver included with Publisher. In the File menu, choose Print, and check Print to File. Then save your publication to disk.

Desktop publishing applications aren't very difficult to use, but producing quality newsletter and flyers can take a little practice. The tips given here should be enough to get you started, but there's no substitute for trial and error. LS

by Leanna Skarnulis

Not So Dummy

The "dummy" text in the newsletter template is worth reading. It gives you advice on how to create a newsletter and tells you how many words will fit in its preformatted text frames.

Terms To Know

bleeds—Color, such as a border, that prints to the edge of the paper. Bleeds can add to the cost of printing.

clip art—Graphic images and photos available in print, CD-ROM, and online formats for you to use in your documents.

Clip Gallery—A collection of clip art packaged with Microsoft Publisher.

dpi (dots per inch) —Dpi is a measure of resolution. Photos, for example, require resolution of 1,200dpi or higher to look sharp.

font—A typeface. Monospaced fonts, such as Courier, allow the same space for each letter, resulting in a typewritten look. Proportional fonts give a more professional look because less space is given to skinny letters, such as i and l, and more space to fat letters, such as m and w.

frame—A box around a graphic or text. It's a tool for resizing, adding, and deleting objects and positioning objects on a page. The frames you see on your screen disappear when you print your page.

object—A text or graphic inside a frame.

point size—The height of type fonts. The bigger the number, the taller the font.

reverse—A light image or text on a dark background.

sans serif—Plain typefaces, without serifs.

serif—Typefaces, such as you're reading now, that have added strokes or lines on letters. These fonts are more readable than sans serif fonts.

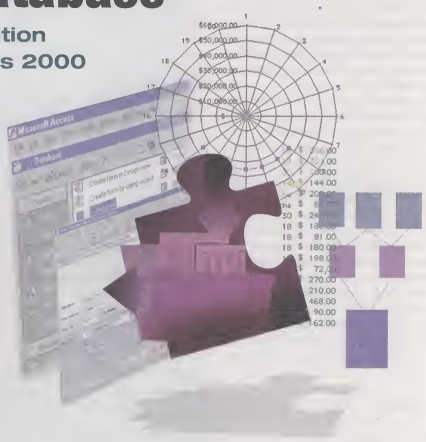
template—In desktop publishing, a template is a sample document, such as a flyer with a tear-off reply. You customize the flyer by replacing its text or images, which act as design guides and placeholders, with your own.

upper and lower case—Capital and small letters.

wizard—A guide that leads you step-by-step. Publisher has wizards for creating flyers, business cards, newsletters, Web sites, and more.

Create A Database

Manage Your Information With Microsoft Access 2000



How do you decide whether you need a database to store your information? Will a spreadsheet or a table in a document more appropriately serve your needs than a database? You can answer questions such as these by refining your needs with answers to the following.

- Is your data for one-time use?
- Will others retrieve the information?
- Do you want to authorize others to add, delete, or revise existing and new data?
- Should others be able to update the data via a Web site?
- Will your data be retrieved over a LAN (local-area network) from other sites or locations?
- Do you want to restrict end-user access to some or all of your data?
- Would you like to e-mail some or all of your data to someone within the company or to a client?

If you answered yes to the first question, you should seriously consider creating a table in a word processing document or a spreadsheet to display your data. But, if you answered yes to any of the other questions, you may want to learn more about Microsoft Access, the database of choice for novice users and high-powered programmers alike.

Key Points

- Databases are ideal for managing information that will be accessed and changed by several different users.
- Certain databases may benefit from having bit-mapped images of products or employees included alongside the information.
- Print reports based on database information to share with other users.

We'll present several different databases to acquaint you with the ease-of-use Access affords for storing, retrieving, and sending data. Custom examples show how to build a database and populate it with forms and reports, both with a wizard and on your own. We'll also introduce you to the Northwind database, a sample database provided by Microsoft Access for individuals who want to move beyond the fundamentals of Access and gain a richer understanding of the power behind its application.

Database Basics. A database lets you track things such as customers, clients, orders, or contacts. For instance, a teacher might want to store the names, classes, and grades of students; an auto dealership might catalog all the various vehicles they offer in several locations; a church administrator might store the names, addresses, and phone numbers of members—the list is endless

Now that you have a basic idea of the function of a database, you'll need an application to manage, develop, and maintain one. There are many database management applications on the market that can handle your essential needs, but not all are user-friendly, nor do they allow storage of an entire project into one file. On the other hand, Microsoft Access has been on the market since 1992 and has since grown in popularity. That's because Access has a powerful built-in macro feature and a programming language (VBA) for automating repetitive tasks. You encounter VBA when you access the Database wizard; the code is automatically built for you.

Access provides two options for building a database: you can build one from the Database Wizard or from scratch. We'll show you how to do both. The wizards are great for building a standard frame for an application. Knowing how to build a database from scratch serves those with specialized needs and makes it easier to customize the output from the Access wizards.

Using The Wizard. Let's create a database using the wizard. While this one is

Asset Tracking

Use this wizard to keep track of your property and equipment, depreciation and maintenance history. If your business owns or leases equipment or property, you can have relational tables that track by category, depreciation, and maintenance schedules. Include such things as the equipment acquisition date, what method of depreciation will be used, and the cost and upkeep of equipment and/or property. You can generate customized reports from the tables. (Your accountant will love you at tax time!) ■

designed for contact management, the general steps apply to all the databases. In the Access dialog box that follows Access' opening screen, select Access Database Wizards, Pages, And Projects. Click OK. Double-click the Contact Management icon and click OK. This takes you to the File New Database screen. You'll need to choose a directory and file name for your new database. Use the Save In drop-down list to select a folder for storing your database file. In the File name text box, you can accept the default name or enter your own custom name. Click Create and then press Next.

The Database Wizard will display a window of Tables and one of Fields (Figure 1). When using a wizard, you can't eliminate preselected fields, which appear in plain text. (Optional fields are in italic.) To add extra fields just scroll down the Fields in Table list, select the ones you'd like, and then click Next. The Database Wizard asks what style to use for screen displays and then for printed reports. Choose a style and click Next. The next screen lets you assign a title to your database. The wizard will ask if you want to start the database once the wizard builds it; select Yes and then click Finish.

■ **The Switchboard.** The Main Switchboard window is the one you'll see each time you open your contact management database. Notice the command buttons. Each one opens a dialog box. Listed below are the main buttons on the Switchboard and their functions:

- Enter/View Contacts. Use this to enter and edit data in your database. Because there are more fields than can fit into one dialog box, the Database Wizard divides them into several form pages, represented by the numbered buttons in the Page: field. The second page starts out with the contact name, which was automatically entered by the Database Wizard; it lets users add Contact Type and has a Memo field for adding extended contact information. You should always set up Contact Type before entering data into the Contacts folder. To set up Contact Type, go to the dialog box titled with the same name as your file and click the Contact Types icon.
- Enter/View Other Information. Use this to view various contact types.
- Preview Reports. Users can preview an alphabetical listing of all the contacts, including contact type, name, company name, title, and work phone. You can also see a breakdown of contact types in your report.
- Change Switchboard Items. Beginners probably should not attempt to make changes to a form created by the wizard, which this button lets you do just that. Consult an experienced Access developer if you want to make changes because these forms contain VBA code.
- Exit this database. This returns users to the Access interface.

■ **Creating Your Own Database.** Now that you've been introduced to creating a database using a wizard, let's create one from scratch. Choose File, New. In the dialog box that appears, choose Database under the General tab. Choose a file name and directory as before, then click Create.

A Database window appears on your screen. The Database window has Open, Design, and New tabs across its top. On its side, there is an Objects bar. Open lets you retrieve an already created database object, Design allows users to customize previously created database objects, and New creates a new database object, such as a table. The Objects bar has icons for tables, queries, forms, reports, pages, macros, and modules. It also offers icons that do not necessarily point to built-in collections of database objects. We'll discuss a subset of database objects especially relevant to this article.

- Tables are a compilation of information about a particular topic, such as employees. You can have many different tables in a database. Any specific table organizes information by row and field. Fields contain information about a specific topic, such as employee hire date. Rows collect all the information for a particular instance of whatever the table is about, for example employees, clients, orders. Each record should have a unique ID. An autonumber data type serves this role well. Consider the case in which you have a list of 100 employees. Each record has columns or fields that list first name, last name, title, company, address, phone number, extension, etc. Access is a relational database manager. Your database designs gain power by linking tables to one another. Figure 2 shows the Relationship window, which depicts the relations between the tables in the database.

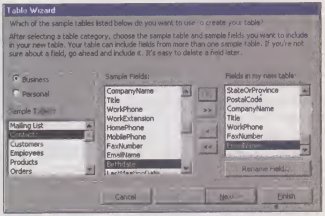


Figure 1. Choose sample fields to include in your own table.

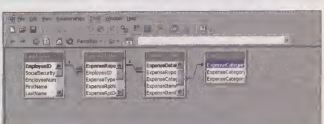


Figure 2. Related fields are marked with integrity links.

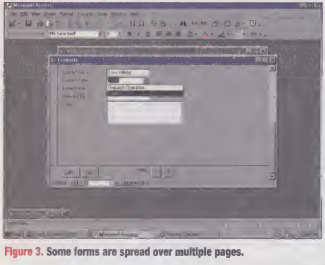


Figure 3. Some forms are spread over multiple pages.

A good example would be a trucking company that reimburses its truckers for diesel fuel usage, hotel stay-over, and mileage driven. This will require several tables: employees, expense reports, expense details, and expense category. Your database design should tie all four of the tables together with referential integrity rules. Referential integrity forces your database to contain valid relational data. For example, you cannot delete an employee record with unpaid expense records.

- Queries analyze, view, or change your data in various ways. They can help you achieve goals such as data retrieval, calculating totals, and cross tab queries. An experienced database designer can add, delete, and insert data automatically with queries. You can use wizards to create queries, however, this can still be a difficult process.
- Forms let users view, edit, and enter information from on-screen displays. Many database users find this a very convenient and user-friendly way to interact with a database.
- Reports offer a way of presenting your data in printed form. Again, there are wizards for helping design reports. Access reports are one of the most popular features of Access since they offer a way to share database content with others even if they do not have Access on their computer. Many Access development efforts consist primarily of building useful reports.
- Data Access Pages (DAP), which are new with Access 2000, let users enter, edit, and view data via an intranet, over a LAN (local-area network), or within an Access application on a standalone computer.

■ **Customize With The Wizard.** You can make your entire database by using the default setting the wizard gives you, but you will also find the wizard helpful for custom projects. For example, even when you create your database from scratch, you might want to use a wizard to add tables.

Go to the Database window. Select Tables from the Objects bar. Double-click Create table in Design view. This opens a dialog box with three columns for defining fields and adding descriptions for the fields. Below the title bar are headings for Field Name, Data Type, and Description. Under Field Name, type: **ContactID, First Name, Last Name, Address, City, StateorProvince,PostalCode, and PhoneNumber**, respectively. Click the Data Type column for and a pull-down list of data types.

The data type defines the type of data that you can enter in a field. Some fields accept numbers, but others contain text of varying lengths. Choose a data type that corresponds to the type of data that a field holds. The three data types used in this example are Text, Memo, and AutoNumber. Text allows a combination of data and numbers as long as those numbers are not for equations. A field with a text data type can contain up to 255 characters. Memo allows text that is lengthy and can hold slightly more than 65,000 characters. You can also use a combination of text and numbers in Memo.

Scroll down to AutoNumber. This data type automatically creates a unique number for each record in a table. Database applications frequently use it for the primary key, a special field or collection of fields that uniquely identifies each record in a table. For example, you can have two entries with the same first name, last name, and even telephone extension. Because they are on separate rows in the table, they have different AutoNumber values.

This AutoNumber field enables all records in the table to be unique. In order to have a well-designed database that is both beneficial and flexible to your needs, you should consider all options before making decisions about your database design.

To create tables with a wizard, go to the Database window, select Tables in the Object bar, and double-click Create Table using Wizard. The next screen gives you a chance to pick between Business and Personal table types.

We chose the Business radio button. Some wizards that were automatically present in Access 97 have been relegated to the Sample

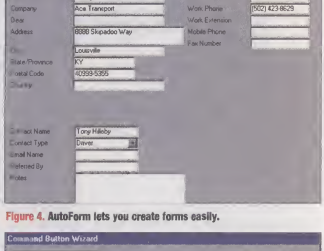


Figure 4. AutoForm lets you create forms easily.

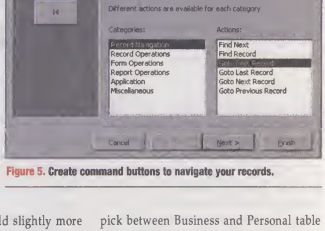


Figure 5. Create command buttons to navigate your records.

Tables section you'll see in the Table Wizard in Access 2000 (see Figure 1), but you can still use them. Scroll through the list. You have at least 25 sample tables from which to choose.

Let's choose Contacts. This populates the adjacent Sample Fields list with all the fields in the sample Contacts table. You can select fields from the Sample table and add them to the custom table that you are constructing. Choose ContactID, then press the first arrow pointing toward Fields In My New Table to add it. Then in order, select and move FirstName, LastName, Address, City, StateorProvince, PostalCode, CompanyName, Title, WorkPhone, FaxNumber, and EmailName from Sample Fields to Fields In My New Table.

When you've added all these fields, click Next. Access names the table Contacts, and asks if you would like a Primary Key; select Yes. (If you have an AutoNumber field in your table, Access will automatically use it for the primary key.) Click Next. A dialog box will appear giving you the option to create relations between the table you are constructing and any additional tables already in the database.

Unless you are experienced at relational database design, accept the default recommendations by clicking Next. This brings you to the final dialog box, which offers you several different ways of opening the table and entering information. Choose one and click Finish to close the wizard and open your new table. You can now enter your data.

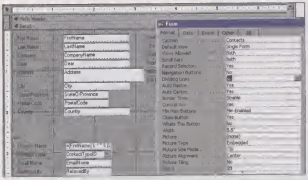


Figure 6. Eliminate the default controls and choose your own.

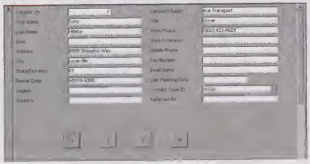


Figure 7. A finished database with custom controls.

■ **Northwind Traders.** Now let's look at the Northwind Traders, a powerful sample database included in Access. Some of our tips for Northwind might be involved and somewhat difficult to apply, though they do offer a lot of power and convenience. You can selectively borrow from the tips here to create your own databases.

Opening the Northwind Database requires several steps: Right-click the Start button on the Toolbar and select Explore to open Windows Explorer. You can use this display to navigate to the Northwind sample database file. You will see a hierarchical arrangement of folders on the left. The right side of the display shows the files in the currently selected folder. There are several folders with (+) signs. Click the + sign to open Program Files; this exposes more folders. Click the + sign next to Microsoft Office, then Office, and then highlight the Samples folder.

The window to your right holds the Contents of the Samples folder. There may be as many as three files with Northwind in their title. Highlight the one with Northwind by itself (not NorthwindCS or NorthwindCS.SQL). The other two are for advanced client/server programming samples. Right-click the mouse and choose Open or double-click Northwind and then click OK once. The blue Welcome screen appears. Click OK to close the welcome screen and open the Database window.

■ **Learning The Ropes.** Once you've got Northwind open, at the top of the screen on the Toolbar, click Show Me to open a dialog box full of help and information on Access and Northwind. Here you'll be able to learn about Northwind database objects and their purpose. Northwind suggests users try out the sample databases, then enter and edit the data. Look at the structure of selected database objects by opening them in Design View. You can view the VBA code the wizards use to make Access user-friendly and hassle-free.

Northwind provides several tables that users can view and try out, including the Categories table. Categories has four fields: CategoryID, CategoryName, Description, and Picture, where you can include bit-mapped images. To view a picture, just double-click Bitmap Image.

This feature is particularly good for a product catalog; viewers from all over the world can view and buy your products. It's a snap to add pictures to a database. Right-click a field defined to contain an OLE (Object Linking and Embedding) data type. Choose Insert Object. Choose Create from File. Then, click Browse to navigate to the file containing the image. Finally, click OK.

Close Categories and open the Employees table in the main screen. Go to the Menu bar and click Tools, Relationships. Figure 2 shows a Relationships window with lines denoting referential integrity links between tables.

When a table has referential integrity with another, you cannot freely edit those features that affect its relationship with a related table. If you need to make a change like this, you have to remove referential integrity first.

You can do this by right-clicking the line connecting two tables in the Relationships window and choosing Edit Relationship. Clear the Enforce Referential Integrity checkbox. Click OK to complete removing referential integrity. After making changes to the table, restore referential integrity by reversing the process.

Events

Use the Events wizard to keep track of all events, their attendees, registration, the type of event, and costs. This is a great database for a business that specializes in training and seminars and programs that target special needs, such as weight loss. Your tables could consist of an event ID, attendee, and registration ID, as well as a fee schedule and payment ID. □

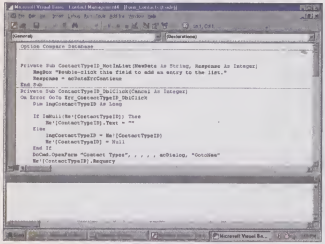


Figure 8. The wizard automatically generates VBA code.

Under the Objects table on the main screen, select Forms. Forms can be used for various purposes: to view and edit data, to enter data into a table, to create a switchboard that lets users access other forms easily, and to create combo boxes that simplify user input.

There are many types of forms, such as multiple page forms like the one we viewed in the Contacts form Figure 3, and continuous form shows all the data for one or more records. This can be helpful in an accounting department in situations requiring the display of record details. Next, there are form controls, including labels, text boxes, combo boxes, lines, rectangles, and images.

■ **AutoForms.** One especially easy way to create a form is with the AutoForm control. We will demonstrate this with data previously input in the Contacts database for the Ace Trucking company and its eight employees, who are divided into two Contact Types, dispatch operators and drivers. Creating an AutoForm is very easy. Highlight Tables in the Objects bar and choose the AutoForm control (it looks like a datasheet with a streak of lightning) on the Toolbar menu. Immediately a form is created. (See Figure 4.)

Now let's customize the form. Click the Design view icon on the Toolbar; it looks like a green triangle sitting sideways on a ruler. Notice that all the information on the form is in one long column. You will often need to shorten the length of the form if not every field is necessary, and you may want to rearrange the location of fields to make them easier to view.

To move fields, select their names, which appear to the left of the fields themselves. We selected Company Name all the way down to Referred By. Notice that when you select a name, it is encased in a little black square. This let's you know it's ready to move. (If you notice that one has not been highlighted, hold down the Shift key and click it).

Position the mouse over the group of selected fields until you notice its icon changes to a hand, then grab the group and move up and to the right of Contact ID. Don't fret if the fields are wider than the screen: Access automatically enlarges the form size for you.

Now for the cosmetics. You may want to align the controls evenly, for example. This time only highlight the labels starting with Company Name down to Referred By. Next, hold down the Shift key and highlight the ContactID text box. To align the controls, choose Align from the Format menu; this brings up a submenu that lets you choose right.

Last Name	Hillsby
Dear	
Address	8888 Skipadoo Way
City	Louisville
State/Province	KY
Postal Code	40999-5355
Region	
Country	
Company Name	Ace Transport
Title	Driver
Work Phone	(502) 423-8629
Work Extension	
Mobile Phone	
Fax Number	

Figure 9. A report created by the wizard.

Another Format menu command permits you to evenly space a set of selected controls. For example, highlight the controls that you moved to the right of the form. Then, choose Format, Vertical Spacing, Make Equal. This evenly distributes controls between the first and last highlighted control.

Next, we'll add a few Command buttons to control record navigation. These custom controls will replace the built-in ones in an Access form. Open up the Toolbox. (If it isn't displayed, you can find it under View, Toolbox.) Make sure you have the Control Wizards icon, which looks like a wand, selected. Click the Command Button icon in the Toolbox. It looks like a little rectangle button located about half of the way down the list. Drag the highlighted control onto the Form and let go. The Command Button Wizard pops up.

Under Categories, highlight Record Navigation and under Actions, select GoTo First Record. Click Next. (See Figure 5.) Then, select the Picture and highlight Go To First 2. (You can choose any style you like. A window in the upper left displays the look of each control icon before you accept it by clicking Next.) Access names the button something like "Command1;" change the name if you like. Repeat the above steps to add Last, Next, and Previous buttons.

Now that we have the directional arrows, we need to eliminate the built-in navigation buttons located at the bottom of the form. To do this, select the form by clicking off to the right outside the form and away from any individual control or form section.

Go to the Toolbar and choose Properties (See Figure 6.) Select Navigation Buttons under the Format tab, click the Down arrow, and choose No. Next, move down to Dividing Lines and select No. Close Properties. Choose Views on the Menu bar and click Form View. Now try out the new controls to see how they work. Figure 7 shows the finished product.

Now return the view to Design and let's view the VBA code generated by the wizard. Click the Code icon to the right of the Properties icon on the Toolbar or select View, Code. This opens a Microsoft Visual Basic window for viewing the automatically generated code. (See Figure 8.) The wizard wrote all those lines of code for you—aren't wizards great?

■ **Creating Reports.** Reports are an essential part of any business. They present data in printed form. From the data for the trucking company, we will create a report using the Access AutoReport tool and then customize the report, as well as save it in

HTML (HyperText Markup Language) to publish it to an intranet or the Internet.

There are three ways to create a report: one is by using the Create Report In Design View option in the Database window. This offers maximum flexibility for the layout, sorting, and grouping of information. Create Report Using The Wizard is another option that can save time. The AutoReport Wizard (located on the Toolbar) lets you produce simple columnar reports of tables with one click. Creating a form and a report are very similar. Using the AutoReport Wizard, we created a report from the data for Ace Transports' dispatch operators and drivers. (See Figure 9.)

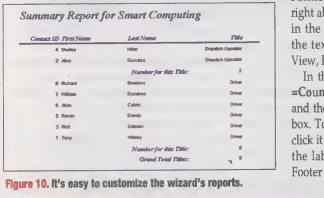
Next, let's customize an existing report by adding subtotals and a grand total. Go to the Database window, choose Reports, highlight Contacts, and then click the Design View icon. We are going to update the form so it counts the number of employees in each title and the number of employees overall.

First, choose the Sorting And Grouping control on the Toolbar. In the first Field/Expression box, open the drop-down list and highlight Title. Then, open the drop-down list in the Group Footer control and select Yes and then close the dialog box. Next, click the Toolbox. Select the text box icon marked 'ab' and drag it to the form. This action copies a text box with its label.

Drag the two to the band called Title Footer. Position the new text box so that it right aligns with the other text boxes in the report's last column. While the text box is highlighted, select View, Properties.

In the Control Source box, type **=Count(ContactID)**, press ENTER, and then close the Properties dialog box. To name the label, just double-click it and type Total Titles right on the label. Go down to the Report Footer section and copy the text and label you just made for Title Footer to the Report Footer section. Double-click the label and type in Grand Total Titles.

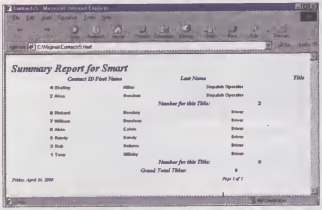
Next, customize the report title. Select the default title by clicking it. Change the name of the title label by double-clicking it and typing in Summary Report for Smart Computing. (See Figure 10.) As you make changes, you can preview your progress by clicking the View button on the Toolbar.



Summary Report for Smart Computing

Contact ID	First Name	Last Name	Title
4	Shelley	Miller	Dispatch Operator
2	Alice	Gundara	Dispatch Operator
		Number for this Title:	2
8	Richard	Brandeley	Driver
7	William	Dundonn	Driver
6	Alvin	Colvin	Driver
5	Randy	Brandy	Driver
3	Rob	Dobson	Driver
1	Tony	Hillsley	Driver
		Number for this Title:	6
		Grand Total Titles:	8

Figure 10. It's easy to customize the wizard's reports.



Summary Report for Smart Computing

Contact ID	First Name	Last Name	Title
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		Number for this Title:	2
8	Richard	Brandeley	Driver
7	William	Dundonn	Driver
6	Alvin	Colvin	Driver
5	Randy	Brandy	Driver
3	Rob	Dobson	Driver
1	Tony	Hillsley	Driver
		Number for this Title:	6
		Grand Total Titles:	8

Figure 11. Access reports published to the Web closely resemble the original documents.

Order Entry

Use the Order Entry Wizard to set up relational tables for customer information, orders, order details, product and payment information, and information about the company and the employees.

This is a good database for companies that handle orders for others. Your tables need to be able to identify pertinent information about each customer, including contacts; payment terms; credit limit, if any; discounts that some customers might receive because of volume of orders or early payment terms; and whether the customer has more than one shipping location. □

■ **Publishing To The Web.** There are several ways to publish Access database contents to the Web. We previously mentioned data access pages. In addition, you can publish standard reports using either static or dynamic publishing techniques. Yet another way to publish reports is with the snapshot viewer that comes with Access. This presents standard Access reports with great fidelity, but it requires your viewers to have a special snapshot viewer control on their computer. You can also enrich your Access applications with Web smarts by adding hyperlinks to your forms so that users can move back and forth between the Web and your custom application.

Select any report you want to publish to the Web in the Database window. Then, choose Files, Export to open the Export Report dialog box. It automatically fills the File Name box with the name of the selected report, and it fills in the Save In box with the location of the folder the report is saved in.

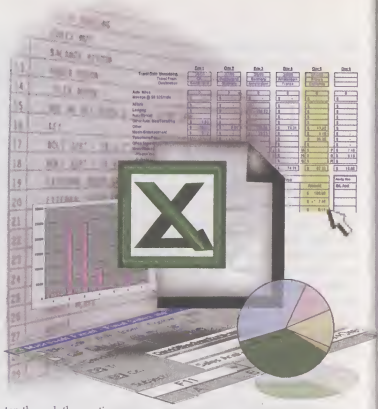
You need to open the Save As Type drop-down box and select HTML Documents. Click Save. Then click OK without entering a template into the HTML Output Options dialog box. You've now saved your Access report as an HTML document. You can copy the saved file to your Web server for viewing on an intranet or over the Internet. You can also preview your new Web document by opening Windows Explorer and double-clicking the saved file. While the published document may not perfectly represent the Access report, for many applications it will be close enough. (See Figure 11.)

By now you should realize that Access offers a lot of flexibility and ease-of-use for novice users as well as the power that more advanced users want. The more you learn, the more your Access software can do for you. LS

by Virginia Dobson

Create A Spreadsheet

How To Use Microsoft Excel To Make Your Life Easier



Spreadsheets are all the rage in business for organizing information and putting it in a user-friendly format. However, they are also a great way to make your personal life—at least part of it—organized and efficient. You can use spreadsheets to track your investments, figure out which bank is offering the best car loan, or set up a personal budget. In short, the main purpose of using a spreadsheet, which is also known as a worksheet, is to track, calculate, and analyze numerical data of all kinds.

To help do this, major spreadsheet programs such as Microsoft Excel include literally hundreds of built-in formulas and tools for custom designing your own formulas. But here's where the real power comes into play: After you initially set up your worksheets, you can enter different values and then watch the bottom line change as Excel recalculates the final result(s) to reflect the new data. Because of this, you can play around with the numbers and then analyze the outcome. (This is something computer gurus refer to as doing a "What If?" analysis.)

All this sounds great, right? Yes, but creating your first spreadsheet can be a little daunting.

So come along with us on a tour of Excel, Microsoft's mainstay spreadsheet program. We'll use it to get you up and running with this powerful and handy type of software, and we'll take you step by step through the creation of your first whiz-bang worksheet.

Key Points

- You can easily organize data using spreadsheets.
- Spreadsheets give you the power to analyze and recalculate data.
- You can customize your own formulas or use Excel's built-in formulas.
- You can add graphics and WordArt objects to spice up a dry Excel worksheet.

■ **The Tour.** You start Excel like any other Windows program: Click the Start button and then choose Microsoft Excel from the Programs submenu. Of course, if you have a shortcut for Excel on your Desktop, it's even easier. Just double-click the shortcut icon or right-click it and then choose Open from the pop-up menu.

Even though you're probably eager to set up your worksheet, it's a good idea to first familiarize yourself with the lay of the land. You'll notice the majority of the screen is the **worksheet**, which is the main working area for the program. The worksheet is simply an electronic grid that consists of columns and rows. It is sort of the computerized version of the accountant's paper-and-pencil ledger. The intersection of a column and row makes up a rectangle, known as a **cell**, into which you can enter information, such as numbers, formulas, and labels. But don't worry that you'll run out of cells anytime soon; there are 65,536 in every Excel worksheet, which is enough for even the most serious bean counter. However, if space does get tight, keep in mind that a default Excel workbook (the proper name for an Excel file) consists of three worksheets. (*NOTE: You can add more worksheets by selecting the Worksheet command from the Insert menu.*)

So you don't get lost in the maze of data in a worksheet, Excel conveniently labels column and row headings with letters and numbers. Furthermore, each cell has a unique address or reference, which is the column letter and row number, such as A1 or C100.

Besides the worksheet area, you'll see screen elements with which you're probably familiar from other programs, such as a Menu bar, toolbar buttons, and a Status bar. But there are some elements unique to Excel, as well. A row of tabs, labeled Sheet 1, Sheet 2, etc., extends along the bottom of the workbook. To move between various worksheets, click the appropriate tab. There's also a Formula bar, which is below the toolbars, you can use to view the selected cell's contents.

■ **Move About.** When you click a cell, it becomes the **active cell** and appears with a darkened border. Additionally, the cell's reference appears in the Name box, which is at the left end of the Formula bar, and its contents appear in the Formula bar.

To move to a cell, you can either click it or use the keyboard arrows. To jump to far-away locations in the worksheet, drag the boxes on the vertical or horizontal scroll bars until the cell you want is in view and then click it. To quickly move to the top-left corner of your worksheet, which is cell A1, press the CTRL-HOME key combination. To spring to a specific location in the worksheet, use the Go To feature. Press F5 (or select Go To from the Edit menu) to display the Go To dialog box. Enter

the cell reference in the Reference field and click the OK button.

If you want to know more ways to electronically cruise around in your worksheets, see Figure 1, which is the Quick Moves chart.

■ **Save It Now.** Before you spend considerable time and effort developing your spreadsheet, make sure you save it. In addition, make sure you periodically save it during the development process. To initially save a worksheet, open the file menu and choose Save As to display the Save As dialog box. Enter the file's name and location and click Save. To update subsequent worksheet changes, click the Save button (it has an icon of a diskette on it), which is on the Standard toolbar.

■ **Selecting Cells.** Now that you know how to navigate within a worksheet, you need to learn how to select cells. Selecting a single cell is simple; just click it. However, you also can select a group of cells, called a **range**, so you can more efficiently work with the cells. For example, this lets you easily format a range or add up its numbers all at once.

To select adjacent cells, click and hold your mouse button and drag over them with the mouse. Alternately, click the first cell in the range, press SHIFT, then click the last cell. If you're a keyboard fan, click in the first cell, press and hold down the SHIFT key, and then press the arrow key for the direction in which you want to select cells. You also can select nonadjacent cells; just press CTRL while clicking the cells. To select an entire column, click the column header. Likewise, to select an entire row, click the row header.

■ **Labels.** Now, let's develop the worksheet. To give you some hands-on practice, we'll guide you through making a profit/loss statement for a small business that manufactures luggage. Of course, you can customize the worksheet by replacing the sample data with your own or use the skills you learn to develop a personal budget.

It's easiest to construct the worksheet if you keep in mind that there are really only three types of data: text, numbers, and formulas. You use text to label, or identify, the data. The numbers are raw values you enter; formulas calculate the raw numbers.

It works well to enter your labels first, then fill in your numbers, and finally add your formulas. To enter any type of data in a cell, click the cell to select it, type the entry, and then press ENTER (or move to another cell). To double-check that you have selected the correct cell, peek at the Formula bar and the Name box. They always display the presently active cell's contents and reference, respectively.

Now try entering your labels. Click in cell A13 and type **Units Sold** before pressing ENTER. Type **Sales Revenue** in cell A14 and **Total** in F11. If you accidentally type incorrect data but haven't pressed ENTER yet, use the BACKSPACE key to erase it. Click the Undo button to reverse your action if you completed (pressed ENTER) the entry.

Then, enter the remaining labels in their corresponding cells using the following information.

- Type **Production Cost** in A17
- Type **Sales Commissions** in A18
- Type **Advertising** in A19
- Type **Overhead** in A20
- Type **Total Costs** in A21
- Type **Profit (in dollars)** in A23
- Type **Profit Margin** in A24
- Type **Selling Price/Unit** in A26
- Type **Product Cost/Unit** in A27
- Type **Overhead Cost** in A29

■ **Use AutoFill.** Now click in B11 and type **1st Quarter** before pressing ENTER. Instead of laboriously typing in the rest of these labels, however, rely on Excel's AutoFill feature. You use this feature to quickly fill a range with data from Excel's built-in lists. It has lists for things such as the days of the week, months of the year, and quarters. To use the feature, select cell B11 and then rest your mouse pointer over the black fill handle in the lower-right corner of the cell until a black crosshair pointer displays. Drag over cells C11 through E11 before releasing the mouse. When you release the mouse, Excel fills in the data for you.

■ **Column Width.** As you entered your labels, you may have been unsettled because Excel extended some of the entries beyond the column or chopped them off. An Excel column displays about nine characters, but the cell can actually contain up to 256 characters. If you

Quick Moves

Use this table as a handy reference guide for key combinations and mouse instructions that will quickly take you to various areas of a worksheet. Once you are proficient at using Microsoft Excel, these quick mouse methods and keyboard shortcuts will make using Excel much less time consuming.

Figure 1.

To	Use This Mouse Method	Use This Keyboard Shortcut
Move to an adjacent cell	Click the cell	Press the arrow keys
Move one screen down	Click the down arrow below the vertical scroll box	Press PAGE DOWN
Move one screen up	Click the up arrow above the vertical scroll box	Press PAGE UP
Move one screen to the right	Click the arrow to the right of the horizontal scroll box	Press ALT-PAGE DOWN
Move one screen to the left	Click the arrow to the left of the horizontal scroll box	Press ALT-PAGE UP
Move to the first worksheet cell (A1)	Click the cell	Press CTRL-HOME
Move to a specific cell location	Click the cell	Press F5, type the reference, and then press ENTER

enter a label longer than the default nine-character column width, Excel truncates the *display* of the extra letters (even though they're still part of the cell's contents) or shows pound signs (###) for number entries that are too long.

However, you can easily resize a column to fully display the cell's contents. Rest the mouse pointer over the right border of the column heading until it displays as a double-headed arrow. Drag the border left or right and release the mouse when the column is the right width. You also can quickly resize a column to fit the widest entry by double-clicking the right border of the heading. Because this is tricky, you may prefer to use another method. Click a column heading to select the entire column and then click the Format menu, Column, and AutoFit Selection.

You also can resize several columns at once. On your worksheet, click the header for column A, press SHIFT, and then click column F's header. Open the Format menu, select Column, and click Width. Type 22 in the Column Width dialog box and then choose OK.

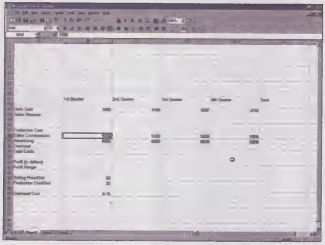


Figure 2. After you have entered all the data, numbers, and labels, your worksheet should match this one.

Entering Numbers.

Now you can fill in raw numbers, which we will use in the formulas we enter. Enter the following values in their corresponding cells in your worksheet.

- 3192 in B13
- 4789 in C13
- 5587 in D13
- 2793 in E13
- 50 in B26
- 32 in B27
- .15 in B29

If you need to type the same value in adjacent cells in a column or row, you can save time by entering the number once and then copying it to the rest of the cells. To try this, type **8500** (Advertising Cost) in B19. Then, click and drag over cells B19 through E19, which selects them as a range, or group of cells. Make sure the first cell in the range, which is B19 in this case, includes the data you want to copy. Next, open the Edit menu, select Fill, and click Right (or simply press the CTRL-R key combination). Use the same technique to place 9200 in cells B18 through E18. (If you want to fill down a column, open the Edit menu, click Fill, and select Down or press CTRL-D.) At this point, your worksheet should appear similar to Figure 2.

Functional Formulas.

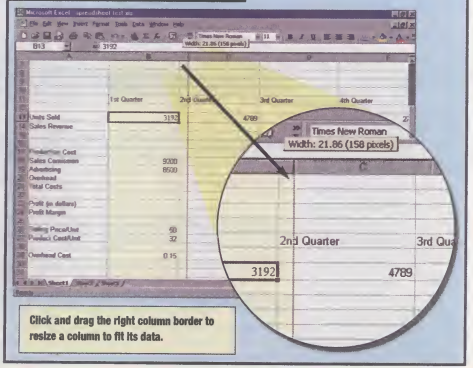
Now you'll fill the gaps in your worksheet by entering formulas. You can build formulas from scratch using cell references and mathematical operators, such as plus, minus, multiplication, and division symbols. Alternately, you can rely on Excel's built-in functions. You usually develop your own formulas when there isn't an Excel function that works for the calculation you want to make. User-built formulas require a little more upfront development to work well, but they provide flexibility so you can calculate virtually any data.

To develop a formula, click in the cell where you want the result to appear, then type an equal (=) sign, which helps Excel identify your entry as a formula. Enter the reference for the first cell you want to include, the mathematical operator, the second cell reference, and so on. To help you get the hang of constructing user-built formulas, refer to the Figure 3.

Now let's dig in and create some formulas. The first one will calculate the total units sold and put the result in F13. To construct the formula, click where you want to display the result, F13, and then type **=B13+C13+D13+E13**. Make sure you've correctly typed the cell addresses (not just the column letter or row number by itself) and then press ENTER. If you're successful, the result, 16361, displays. (Don't worry about the lack of a comma in this long number. We'll tidy up the worksheet's formatting later.) To demonstrate Excel's ability to quickly recalculate data, change the data in Cell B13 to 4500 and press ENTER. Watch the result in F13 change to 17669.

You also can copy formulas to new locations. For example, you can copy the formula that

Resizing Columns



totals the Units Sold row in cell F13 so it adds up the cost of Advertising (the result of which would appear in F19) because you're using similar cells. When you copy the formula, it uses the same column letters, but bumps down the row references. This is known as **relative cell addressing**. To copy the formula, select the cell with the formula you want to copy, cell F13, and then click the Copy command from the Edit menu. Click in the cell where you want to copy the formula, F19 in this example, and then select Paste from the Edit menu. Paste the formula in F18, as well, before pressing ESCAPE to get out of the copy and paste functions.

Now you're ready to delve into a more complicated formula: one that calculates the Sales Revenue. To do this, you'll multiply the Units Sold, which is in B13, by the Selling Price/Unit, which is in cell B26. Select the cell where you want the result, B14 in this case, then type **=B13*B26**. Press the ENTER key and the result, 225000, displays.

■ **Make It Absolute.** You could enter a similar formula in cell C14, such as =C13*B26, or just copy the existing formula from B14 to cells C14:E14. If you choose the second option, however, you'll encounter the stark reality about relative and absolute cell references. Excel normally copies formulas **relative** to their original location. For example, when you copied the formula earlier in this article for the Units Sold, in Cell F13, to the cost of Advertising, in cell F19, Excel automatically adjusted the cell references in the formula so they would add up the cells in Row 19.

Much of the time, you'll use relative cell addresses. However, if you want the reference in your formula to *always* refer to a specific cell reference, you should instead use an **absolute cell reference**. When you do this, the reference stays frozen in the formula, no matter where you copy the formula. You let Excel know a reference is absolute by entering a dollar sign ($) before the letter and number in the cell reference, such as B26.

With this in mind, modify the existing formula in B14 so the reference to B26 is absolute. Select B14 and press F2, which places the cell contents in Edit mode. Next, press the BACKSPACE key three times to delete "B26." Then, type B26 and press ENTER.

Mathematical Operators

To create user-built formulas, you need to use some basic mathematical operators. Here are the four most-often used ones.

Figure 3.

To	Use This Symbol	Example
Add	+	=A1+A2
Subtract	-	=A1-A2
Multiply	*	=A1*A2
Divide	/	=A1/A2

To copy the formula, drag B14's fill handle in to the right until you have highlighted cells B14:F14 (B14 through F14). Release the mouse. Click C14 and look at the Formula bar to confirm that Excel changed the relative cell reference, B13, to C13 while the absolute cell reference, B26, stayed the same.

■ **More Formulas.** To flesh out the worksheet, let's expand on your knowledge and add some more formulas. To calculate the Production Cost in B17, type **=B13*B27** and press ENTER. Copy the formula to cells C17:F17. Next, figure Overhead as a percentage of Sales Revenue. To do this, multiply the Overhead Cost in B29 by the Sales Revenue. The formula in B20 should be =B14*B29. Copy this formula to cells C20:F20.

To calculate the Total Costs, we'll use one of Excel's built-in functions. Even though there are hundreds of functions, you won't get lost if you remember most are structured in three parts: the equal sign, the function's name, and the **arguments** (variable information) in parentheses. Arguments often include the range, which you indicate by including the first and last cells in the group, separated by a colon. To total the 1st Quarter costs in B17:B20, we'll use the SUM function. Click B21 and type **=SUM(B17:B20)** before pressing ENTER.

To enter this function more efficiently, use Excel's AutoSum feature. Click in C21 and then click the AutoSum button (which has the Greek letter sigma on it) on the Standard toolbar. Excel figures out the probable range you want to add (by finding all the data cells above or to the left of the formula cell) and designates it with a moving border. If the indicated range is correct, press ENTER. To get the hang of the AutoSum feature, use it to find the Total Costs for the 3rd and 4th Quarters and for the year.

The formula you use to find the Profit (in dollars) is straightforward. Subtract the Total Costs from the Sales Revenue. In B23, type **=B14-B21** and press ENTER. Copy this formula (using relative cell references) to cells C23:F23.

Your last formula calculates your Profit Margin. To do this, divide your Profit (in dollars) by the Sales Revenue (=B23/B14) and show the result in B24. Copy this formula to C24:F24. Your finished worksheet should appear similar to the one shown in Figure 4.

If you're interested in finding out more about Excel's formulas and functions, open the Help menu and select Microsoft Excel Help. On the Answer Wizard page, type **Functions** or **Formulas**. Press ENTER to see a list of subtopics and then explore to your heart's content. You also can spend a few minutes plugging different values into the cells for the Selling Price/Unit, Production Cost/Unit, and Overhead Cost and viewing the result on your worksheet.

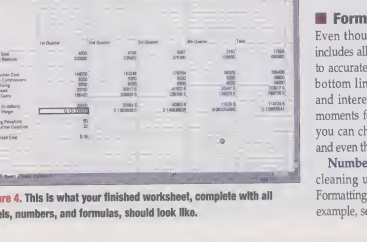


Figure 4. This is what your finished worksheet, complete with all labels, numbers, and formulas, should look like.

■ **Format The Worksheet.** Even though your worksheet now includes all the information you need to accurately assess your company's bottom line, it'll be more readable and interesting if you spend a few moments formatting it. For example, you can change fonts, add commas, and even throw in a graphic or two.

Numbers. Excel includes tools for cleaning up your worksheet on its Formatting toolbar. (See figure 5.) For example, select B14:F14 and then click

the Currency Style button (which has a dollar sign on it) to add a dollar sign, commas, and two decimal places. If you don't see the Currency Style button on your Excel 2000 toolbar, view and select it by clicking the More Buttons button, which has two right-pointing arrows. To remove the extra decimal places, click the Decrease Decimal button (which has numbers with decimal places and a right-pointing arrow) twice.

Another commonly used number formatting is Comma Style. Try using this button by selecting B13:F13 and then clicking the Comma Style button (which has a comma on it). Use the Decrease Decimal button to remove the extra decimal places. Then format the cells in B17:F23 with your choice of Comma or Currency Style.

You also can make cells with percentages easier to read by selecting them and then clicking the Percent Style button, which has a percent sign on it. To do this on your worksheet, select B24:E24 and then click this button. In addition, apply the percentage style to B29. To finish your number formatting, format B26 and B27 using the Currency Style button.

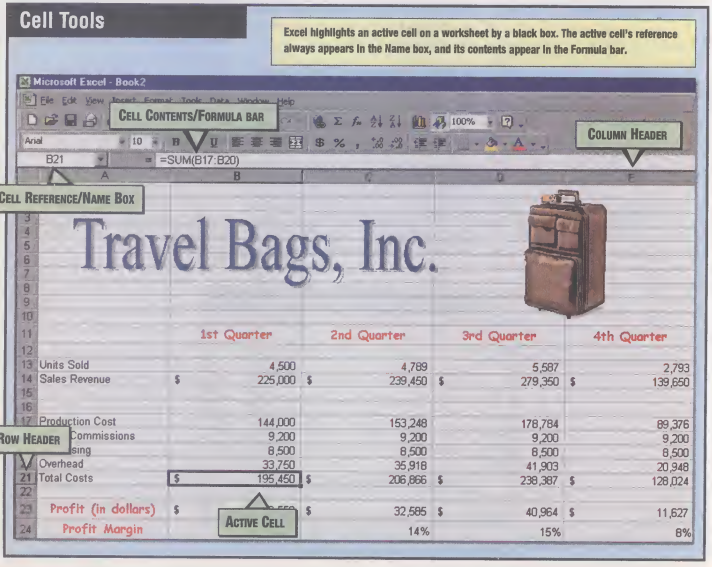
Style. In addition to number formatting, you can modify the look of cells you select by clicking the Bold, Italic, or Underline buttons on the Formatting toolbar. You also can change the typeface size or style by choosing them from the Font and Font Size drop-down lists.

To use some of these features, select B11:F11 and then click the Bold button (the one with the letter B on it). Click the Font drop-down list arrow and choose a different typeface, such as Comic Sans MS. With the cells still selected, click the Font Size drop-down list arrow and choose 11. It's also a nice touch to adjust the placement of data for your labels. On your worksheet, make sure B11:F11 is selected and then click the Center button (which looks like centered text).

You also can change font color to highlight information or titles. To do this, select the cells and then click the Font Color drop-down list arrow. (The Font Color button is the one with the capital A.) Choose a color from the palette. To later remove the color, choose the Automatic option from the palette. Try changing font color on your worksheet by selecting B11:F11 and then choosing red on the palette.

(NOTE: For more full-fledged formatting choices, open the Format menu and select Cells. In the Format Cells dialog box, you will have many more options from which to choose.)

■ **Painting The Format.** You can quickly apply formatting from one range to another by using the Format Painter button, which has the icon of a paintbrush on it, on the Standard toolbar. You may have to click the More Buttons button in Excel 2000 to view this button. For example, you can apply the combination of formatting you used for the titles in row 11 (1st Quarter, 2nd Quarter, etc.) to some of the labels


Cell Tools
Excel highlights an active cell on a worksheet by a black box. The active cell's reference always appears in the Name box, and its contents appear in the Formula bar.
Microsoft Excel - Book2
Cell Contents/Formula Bar
Column Header
Cell Reference/Name Box
B21
=SUM(B17:B20)
Travel Bags, Inc.
1st Quarter
2nd Quarter
3rd Quarter
4th Quarter
Units Sold 4,500 4,789 5,587 2,793
Sales Revenue $ 225,000 $ 239,450 $ 279,350 $ 139,650
Production Cost 144,000 153,248 178,784 89,376
Commissions 9,200 9,200 9,200 9,200
sing 8,500 8,500 8,500 8,500
Overhead 33,750 35,918 41,903 20,948
Total Costs $ 195,450 $ 206,866 $ 238,387 $ 128,024
Profit (in dollars) $ 32,585 $ 40,964 $ 11,627
Profit Margin 14% 15% 6%
Row Header
Active Cell

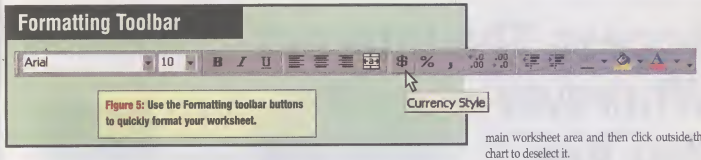


Figure 5: Use the Formatting toolbar buttons to quickly format your worksheet.

in column A. Click B11, which is the cell you'll use to let Excel know the formatting you want. Double-click the Format Painter button and then click and drag over cells A23 and A24. Click the Format Painter button again to turn it off.

■ **WordArt.** You also can jazz up your worksheet by using WordArt to add an easy-to-read title. Here's how: Open the View menu, select Toolbars, and click Drawing to display the Drawing toolbar. On the Drawing toolbar, click the Insert WordArt button, which has a blue letter A on it, to display the WordArt Gallery. You can choose any style of WordArt you want. If you want your object to match the worksheet in the figures, you should choose the second style from the left on the second row.

Double-click the style you want . . . and you will see the Edit WordArt Text dialog box. Type the title for your worksheet, **Travel Bags, Inc.**, and then click OK. To resize the object, rest your mouse pointer over a selection handle until a two-headed resizing arrow displays and then drag. Moving the object is a bit trickier. Move the mouse pointer over the text object until a four-headed black pointer (with a white arrow attached) is shown rather than normal fat, white crosshairs used in Excel. Drag to move the object to the blank area above your worksheet. Click outside of the object to deselect it.

■ **Add A Graphic.** You also can add a graphic in your worksheet. The easiest way to do this is to rely on images (called clips) in the Clip Gallery. Click the Insert Clip Art button, which looks like a picture, on the Drawing toolbar to display the Insert Clip Art dialog box. Click a category, such as Travel, to display related clips. Alternately, type a topic, such as luggage, in the Search for Clips box and then press ENTER. When you locate the clip you want, click it and then choose Insert Clip (the first option) from the pop-up menu. Resize and move the clip to the right of the WordArt object.

■ **Charting Data.** One of the great things about Excel is its ability to translate statistical or numerical data into easy-to-understand charts. Even though there are many types of charts you can create in Excel and many ways to format charts, we'll concentrate on getting you up and running by creating a basic pie chart that shows the units sold by quarter.

First, select the cells, A11:E13, upon which you want to base your chart. It works best if you include labels that identify the chart data, as well as the numbers. Click the Chart Wizard button, which looks like a chart, on the Standard toolbar to display the opening page of the Chart Wizard dialog box. You use this page to identify the type of chart you want. Choose Pie on the Chart Type list and then click Finish. Excel creates your chart as an object that's layered over your chart area—much like you would place a sticky pad note on a sheet. You can move and resize the chart object like any other object. Drag a resizing handle to resize the chart, then rest your mouse pointer over the middle of the object and drag to move it. So your chart doesn't cover up the worksheet data, move it below the main worksheet area and then click outside the chart to deselect it.

■ **Finishing Touches.** Before you exit Excel, you'll probably want to print a copy of your worksheet. To see how your worksheet will appear when printed open the File menu and click Print Preview. To change the layout of the worksheet, click the Setup button. You can choose the orientation, landscape, or portrait, on the Page tab, as well as modify the scaling. Enter a number greater than 100 in the Adjust To field to make the worksheet data larger. Enter a number less than 100 to fit more (but smaller) data on the printed page.

When you finish setting options, click the OK button to clear the Page Setup dialog box and see how your revisions appear. To print the worksheet, just click the Print button, which displays the Print dialog box. (You also can display the Print dialog box from your Excel screen by choosing Print from the File menu.) Click OK, and you'll print your stunning, created-from-scratch worksheet. LS

by Linda Bird

Terms To Know

cell—The intersection of a column and row on a worksheet, such as cell C2, which is the cell at the intersection of column C and row 2. (Letters identify columns; numbers identify rows.) The cell is where you enter information.

cell reference—A column heading followed by the row number, such as F15.

functions—Excel's built-in functions are those that come with the program and help you calculate almost anything, including standard deviation to your monthly house payment.

headers—Gray boxes at the top of columns and to the left of rows that help you keep your bearing on a worksheet.

range—A group of cells. You specify a range by entering the first cell in the group, a colon, and then the last cell. For example, A1:B3 includes cells A1, A2, A3, B1, B2, and B3.

spreadsheet—An electronic document that includes columns and rows set up in a grid-like pattern. Spreadsheets are used for tracking and number crunching. It is also known as a worksheet.

user-defined formulas—Formulas you develop from scratch using cell references and mathematical operators to calculate data.

Access The Internet Wherever You Are

Tools & Tips For Staying Online When You're Away From Home

Internet everywhere: It's the mantra of the 21st century, the creed that drives the high-tech industries, the goal of hardware and software manufacturers around the world. In the United States, the infrastructure for ubiquitous Internet access is largely in place. Practically every office, school, and library has facilities for going online, and the majority of homes are wired for the Internet, as well. Technology developers are working on products that will bring the Internet into your bedroom, your kitchen, even your bathroom. If the Internet isn't everywhere already, it soon will be.

But just because the Internet is everywhere doesn't mean you have access to it from anywhere. To take advantage of global connectivity, you need the proper equipment, a universal gateway (a point of entry on a network), and an understanding of how to establish contact with the Internet under even the most primitive of conditions. We'll show you how you can get yourself wired wherever you may be.

Hardware Must-Haves. Internet access begins with hardware. Without a few key pieces of solid equipment, you're not going anywhere in cyberspace. Fortunately, it's likely that you already own a computer and modem, which are the most expensive pieces of equipment.

Computer. First and foremost, you need a computer of some type. The computer of choice for most people is a notebook PC. Notebooks are appealing because they provide a level of all-around functionality that isn't available in most other mobile computing devices. Notebooks feature nearly full-size keyboards, for example, and they sport multiple input and output ports, including USB (Universal Serial Bus), parallel, and serial ports. They also contain large hard drives, fast processors, copious amounts of RAM (random-access memory), and high-quality audio and video cards, all of which are necessary if your computer is going to accommodate the various forms of data you may encounter.

Key Points

- Remote Internet access starts with hardware. You need the proper equipment if you're going to connect to the Internet while you're on the road.
- You have virtually endless options when selecting an ISP (Internet service provider). Make sure you choose an ISP that offers access wherever you need it, even overseas if necessary.
- Although you can obtain remote ISDN (Integrated Services Digital Network) and wireless connectivity, your most reliable and widely available access option at the present time is dial-up access through an analog modem.
- The process of connecting to the Internet while you're on the go is very similar to the process of accessing the Internet at home or in the office.

For best performance in any dial-up situation, your notebook should have a Pentium processor and at least 32MB (megabytes) of RAM. The notebook also should run Windows 9x, Windows NT 4.x, or Windows 2000. These operating systems not only have built-in connectivity options, such as Dial-Up Networking and HyperTerminal, but they also support Plug and Play, which allows you to avoid unnecessary configuration issues while you're away from any technical support services.

You also can use a handheld computer or an Internet-enabled cellular phone to access the Internet while you're on the road. These devices work well for performing basic Internet-related tasks, such as sending and receiving e-mail messages, checking stock quotes, and browsing news headlines. Some of the most popular handheld computers currently on the market are produced by Casio (http://www.casio.com), Hewlett-Packard (http://www.hp.com), Palm (http://www.palm.com), Royal Philips Electronics (http://www.philips.com), and Sharp Electronics (http://www.sharp-usa.com). Internet-enabled phones are produced by Motorola (http://www.motorola.com), NeoPoint (http://www.neopoint.com), and Nokia (http://www.nokia.com), among others.

Modem. When you're at home or in the office, you have multiple options for accessing the Internet: dial-up, cable, leased line, ISDN (Integrated Services Digital Network), DSL (Digital Subscriber Line), or DBS (Direct Broadcast Satellite). When you're on the road, however, your options are limited by availability and practicality. Dial-up access via an analog modem is your best bet.

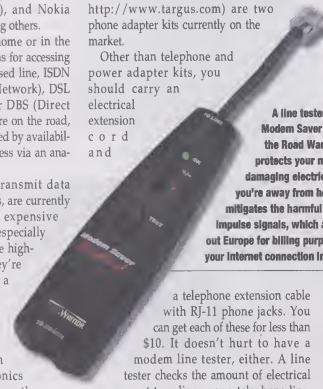
Analog modems, which transmit data across standard telephone lines, are currently the most popular and least expensive access option. They're slow, especially when compared to some of the high-speed access options, but they're reliable. As long as you can get a dial tone, you can use your analog modem to access the Internet. Multi-Tech Systems (http://www.multitech.com), Xircom (http://www.xircom.com), and Zoom Telephonics (http://www.zoom.com) are three manufacturers that produce analog modems for notebook PCs and handheld computers. Analog modems are typically sold for $70 to $130.

Accessories. A computer and a modem are the basics. What aren't so basic but are equally necessary for frequent travelers—especially international travelers—are a few hardware accessories that facilitate the process of connecting to the Internet.

The first thing you need if you travel abroad is a power adapter kit containing a power converter and power adapters. A power adapter kit helps you plug your electronic devices into foreign power sources without damaging them. You can find power adapter kits for less than $50 at many electronics stores and most international airports, but your best bet is to visit Radio Shack (http://www.radioshack.com). Radio Shack offers a broad selection of power adapters and converters.

You also need a phone adapter kit for your analog modem. Telephone jacks differ from country to country. The jack of choice in the United States is the RJ-11 (registered jack-11). You won't find RJ-11 jacks when you travel to foreign countries, though. To get around this problem, you need to get a phone adapter kit. The Xircom International Modem Travel Kit ($129; 800/438-4526, 805/376-9300) and the Targus Travel Connection Pack World ($99.99; 877/482-7487, 714/765-5555; http://www.targus.com) are two phone adapter kits currently on the market.

Other than telephone and power adapter kits, you should carry an electrical extension cord and a telephone extension cable with RJ-11 phone jacks. You can get each of these for less than $10. It doesn't hurt to have a modem line tester, either. A line tester checks the amount of electrical current traveling over a telephone line. This is necessary if you access the Internet from hotel rooms, which often have digital telephone lines that carry too much current for your analog modem to handle. The Modem Saver International from the Road Warrior Outpost ($59.95; 800/274-4277, 775/850-2546; http://warrior.com) and Port Inc.'s Modem Line Tester ($29.99; 800/242-3133, 203/852-1102; http://www.port.com) are examples of line testers for the international and domestic traveler, respectively.



A line tester, such as this Modem Saver International from the Road Warrior Outpost, protects your modem from damaging electrical currents when you're away from home. It also mitigates the harmful effects of tax impulse signals, which are used throughout Europe for billing purposes and can kill your Internet connection in midtransmission.

■ **Software Necessities.** The software you need to access the Internet while you're on the go is nearly identical to the software you would use to access the Internet while sitting at your desk. In addition to the operating systems mentioned above, you also need dial-up software and the latest version of the Netscape or Microsoft browser. You should have antivirus software, as well.

Although there isn't any other software absolutely required for domestic or international connectivity, mobile computer users often take advantage of remote access software. This software gives you direct dial-up access to your home or office network. Two major remote access applications are Symantec's pcAnywhere ($169.95; 800/441-7234, 408/253-9600; http://www.symantec.com) and LapLink.com's LapLink ($169.95; 800/343-8080, 425/483-8088; http://www.laplink.com).

■ **ISP Assistance.** Finally, you must have an account with an ISP (Internet service provider). Fortunately, you have several cost-effective connectivity options available to you. Which one you choose depends on how you access the Internet and where you travel.

Regional dial-up ISP. The vast majority of Internet providers are regional ISPs. These ISPs provide Internet access within a limited local or regional coverage area. The typical monthly fee for regional ISP connectivity ranges from $10 to $30 a month, and coverage areas vary from one city to several states. You'll find a list of regional ISPs in your local yellow pages under an Internet listing.

Many users prefer regional ISPs because they tend to offer the highest level of personal service and because they often provide local access numbers in rural areas. If you travel occasionally (three or four times a year) or you travel frequently within a defined region, such

as New England or the Pacific Northwest, then a regional ISP may be an excellent alternative. A dial-up analog modem and a list of local access numbers are all you'll need to access a regional ISP when you're on the road.

National dial-up ISP. A growing number of ISPs, including EarthLink Network (http://www.earthlink.net), AT&T WorldNet (http://www.att.net), and Juno Online Services (http://www.juno.com) offer national coverage. These ISPs feature dial-up access numbers in every state and almost every area code, but coverage isn't ubiquitous. Most of the dial-up numbers are based in populated areas.

National ISPs, which typically charge less than $25 per month, are ideal for domestic travelers who primarily visit midsized to large metropolitan areas. Domestic travelers who visit both urban and rural areas may be served best with a national ISP, too. If you fall into this latter category, look for a national ISP that provides a toll-free access number.

EarthLink and Global Frontiers (http://www.globalfrontiers.com) are two national ISPs that provide toll-free access. For these services, users typically pay a higher monthly service charge or a per-hour charge or both. Global Frontiers charges $6 for each hour of toll-free access you use, for example, and EarthLink charges $24.95 for the first five hours of toll-free access, plus $4.95 per hour after that. In return for these fees, you can access the Internet via a toll-free call from anywhere in the United States or Canada.

Global ISPs. A relatively recent phenomenon among ISPs is the concept of global dial-up Internet access, which is sometimes referred to as roaming access. With global Internet access, you can get dial-up Internet connectivity in hundreds of cities and dozens of countries in every corner of the world. This is arguably the cheapest and most convenient way to access the Internet while abroad. Because you're accessing the Internet through local dial-up numbers instead of through a long-distance call, global access also tends to give you the fastest connections. All you need is a dial-up modem and a list of local access numbers from the global service provider.

The Sierra AirCard 300 from Sierra Wireless ($379; 877/231-1144, 604/231-1100; http://www.sierrawireless.com) lets you connect your mobile PC to a wireless network. Unfortunately, ubiquitous wireless connectivity is not yet a reality.

There are two schools of global service providers. The first consists of large ISPs and telephone companies, such as AT&T (http://www.attbusiness.net) and UUNET (http://www.uu.net). These providers offer roaming access to customers who currently subscribe to their local Internet access plans. The second school of global providers is made up of small niche-oriented ISPs, such as NET-ROAMER (http://www.net-roamer.com). These so-called roaming ISPs offer add-on roaming packages and allow you to use any other ISP for your local Internet access.

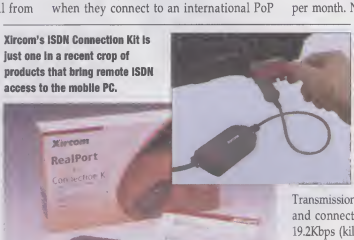
Either way, global ISP access costs are quite reasonable. AT&T, for example, charges a roaming fee of $9 per hour for access to the Internet outside of the United States. UUNET, which is an MCI WorldCom company, charges its subscribing customers a fee of $6 per hour when they connect to an international PoP (Point of Presence). NET-ROAMER charges a $5 membership fee for each month the service is used, plus 25 cents for each minute of roaming connect time. One of the best deals we found was offered by PSINet (http://www.psinet.com), which gives its U.S. customers free global roaming in 10 countries, including Canada, France, Germany, Italy, Japan, and the United Kingdom.

As with national ISPs, global ISPs typically stick to the largest metropolitan areas when offering service. That's appropriate, as these are the places you're most likely to be when you travel internationally. If you plan to roam the European countryside or take a safari to the heart of Africa, however, you'll still have to pay long-distance connection charges or forgo the connection until you can locate a telephone jack.

Other access options. At the present time, dial-up access offers traveling computer users quick and reliable connectivity at the lowest price. This is true especially for international travelers. Other options are available, though, especially if you plan to travel primarily in the United States. Those alternatives are wireless and ISDN access.

Wireless connectivity is the most exciting of the access technologies. With wireless service, you can connect to the Internet wherever you are—in a restaurant, in your car, at the airport—regardless of whether you can find a phone jack. Prices for wireless service are reasonable, typically ranging between $30 and $60 per month. New wireless devices are coming out all the time, too, making it easier and more convenient to access the Internet while you're on the road.

Nevertheless, despite its great potential and the onslaught of new devices that promise to simplify your life, the fact remains that wireless connectivity at present is fragile, slow, and inconsistent. Transmissions are susceptible to interference, and connection speeds top out at a measly 19.2Kbps (kilobits per second). Moreover, service is limited to the largest metropolitan areas. Des Moines, Toronto, and Atlanta are just a few of the cities where the industry standard CDPD (Cellular Digital Packet Data) protocol is not operational. Although wireless



Xircom's ISDN Connection Kit is just one in a recent crop of products that bring remote ISDN access to the mobile PC.

connectivity is an attractive option for users who spend most of their time in a handful of major cities, it's not yet feasible for the majority of travelers who need widely available Internet access.

ISDN is another attractive access option. Thanks to the advent of portable ISDN adapters, such as Multi-Tech System's MultiMobile PC Card ISDN Modem ($259; 800/328-9717, 612/785-3500; http://www.multitech.com) or Xircom's ISDN Connection Kit ($315; http://www.xircom.com), and an increase in the number of national ISPs that offer ISDN access, you can get ISDN Internet access in many parts of the country, as well as in some international locations. ISDN is fast, reaching speeds of 128Kbps, but it's also costly, and coverage is sporadic. UUNET and PSINet are two of many ISPs that offer nationwide ISDN access. Prices for ISDN service vary widely, ranging from $25 to $150 per month.

DSL and cable modem access are not available for travelers. Both have substantial hardware requirements that can only be implemented in a home or office environment.

■ 3 . . . 2 . . . 1 . . . Contact.

Once you have the equipment and service provider, establishing a connection with the Internet is not a difficult prospect. In the most common scenario, you simply need to change the access number and create a new profile to accommodate the remote location from which you're calling for access. Occasionally, however, you'll need to create a new connection entirely. Both options are a breeze.

Either way, you use the Dial-Up Networking software that comes with Win9x and WinNT to establish your connection. You can access Dial-Up Networking by opening the Start menu and burrowing through the Programs, Accessories, and Communication Tools folders until you reach the Dial-Up Networking option. Click it once and a Dial-Up Networking folder will display on-screen. The folder should contain at least two icons: one labeled with the name of your ISP and another labeled as Make New Connection. You'll need to use the former to establish a new dialing profile, and use the latter to create a new connection.

(*NOTE: International dial-up connections are identical to domestic dial-up connections, except for the fact that every country has its own unique phone numbering system. Check with your ISP to learn exactly how you should dial the local access number when visiting a foreign country.*)

Dialing profile. From within the Dial-Up Networking folder, double-click the icon labeled with the name of your ISP. A Connect To dialog box will appear on-screen. This box contains your user name and password, as well as the phone number and information about the location from which you are calling. As long as you're using the same ISP for remote access as you use to access the Internet from your home or office, the only thing that will change is the location information. Your dial-up configuration, including the TCP/IP

The Xircom International Modem Travel Kit gives you all of the connectors you need to access the Internet through the phone lines in more than 160 countries.

(Transmission Control Protocol/Internet Protocol) settings, will remain the same.

To create a new dialing profile, click the Dial Properties button. The Dialing Properties dialog box will appear on-screen. Start at the top of this screen and work your way to the bottom, providing the very basic information it requests of you. For instance, the top line of the dialog box asks where you are dialing from. Click the New button to create a new profile, then type a name for the profile where the words New Location appear. The information you enter in this field will remain as the name of the location profile.

Complete all the relevant information in the dialog box. If you plan to pay for your charges with a calling card, you can configure Dial-Up Networking to handle the calling card connection automatically. Check the Calling Card option and click the corresponding button to enter your calling card information. You need to provide the name of the card, the PIN (personal identification number) or calling card number, the access phone number, and the rules governing the order in which the information must be entered when making a call.

After you've completed the Dialing Properties dialog box, click OK. You'll return to the Connect To dialog box. Now, whenever you want to connect to your ISP while you're on the road, you select the appropriate dialing profile, enter the local access number in the Phone Number field, and click Connect.

A new connection. To devise a new connection, click the Make New Connection icon in the Dial-Up Networking folder. The Make New Connection Wizard will appear on-screen. In this box, enter a name to represent the connection. Your modem should appear by default in the Select A Modem field. If it doesn't, choose your modem from the list and then click Next.

Enter the area code and telephone number of the access number you need to dial for service. Select your country from the list, and click Next. A message on the next screen indicates you have successfully created the new connection. After you click the Finish button, an icon for the new connection will appear in the Dial-Up Networking folder.

You're not finished yet, though. You still need to fine-tune the connection. In the Dial-Up Networking folder, locate the icon for your new connection, right-click it, and choose Properties from the pop-up menu. A dialog box will appear on-screen. Select the Server Types tab, and then click the TCP/IP Settings button. In the resulting TCP/IP Settings dialog box, you can enter the IP (Internet Protocol) and DNS (domain name server) addresses. Contact your ISP to obtain this information. After entering the information, click OK. The new connection is set.

If you use your alternative dial-up connections with great frequency, you can add shortcuts for them to the Windows Desktop. Simply drag the new dial-up icon from the Dial-Up Networking folder and drop it on the Desktop.

■ Considerations For The Road.

It should be apparent by now that accessing the Internet from the road is not much different from accessing it at home or the office. Nevertheless, there are a few tips and considerations you should keep in mind for

optimizing access to the Internet while you're traveling.

First, pay attention to specifications. Although you may not think much about modem and ISP specifications when you're accessing the Internet at home or in the office, it's imperative that you be aware of these specs when traveling. Pay particular attention to the transfer rate supported by the access number. Make sure the transfer rate is equal to or faster than your modem's highest supported transfer rate. Also, make sure the 56Kbps access numbers support modems that conform to the V.90 communications protocol.

Another specification you should consider is the maximum e-mail capacity. When checking for e-mail messages every day as you do at home or the office, you can get by with a small (2MB or 3MB) mailbox capacity. You may not have the opportunity to check your e-mail messages quite so often when you're on the road, however, so your e-mail inbox must be capable of storing all the messages you might receive.

Secondly, think twice before jumping on the freebies bandwagon. You can get free Internet access, free e-mail addresses, free home pages, and free online faxing just by registering with any number of sites on the Web, including Yahoo! (http://www.yahoo.com) and Excite (http://www.excite.com). Despite the price, these services may not be a good deal for you. For one thing, they're not designed as business communications tools and may impede your business practices. For example, some free e-mail services don't support e-mail attachments, which are frequently used to send data among business associates.

Similarly, you should think about what your use of an Internet freebie says about you and your business. Do you want your clients and business associates to know that you can't or won't pay $20 a month for a standard e-mail address? What will your clients and colleagues think when they see that your fax number bears an area code that is different from your telephone number? These are some of the questions you should consider when deciding which ISP to use for national or international access.

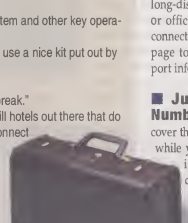
A third tip when accessing the Internet while you're traveling is to prepare yourself for the worst and keep calm when the worst happens. If you experience problems when connecting to a remote access number, first reboot your system to see if that solves anything. Next, try to access the Internet with another local access number. You should keep a text list of local access numbers on your PC so you always have them on hand. In the worst-case scenario, make a long-distance call to your home or office access number. Once connected, visit the ISP's home page to review technical support information.

Suitcase Stuffers

If you're like most experienced travelers, you probably have a list of items that accompany you wherever you go. Such things as spare socks, business cards, aspirin, an address book, and anything else you want to have close just in case. Get ready to add to that list. If you plan to access the Internet while you're away , you need to pack a few more items in your overstuffed bag.

We asked Frank A. Fiore, a seasoned traveler and founder of NET-ROAMER (http://www.net-roamer.com), to tell us what he carries with him when he hits the road. These are the items that Fiore considers to be must-haves.

1. Updated antivirus software. "Because when you travel, you will be exposed to disks from others, and these carry viruses."
2. A CD-carrying case containing installation discs for the Windows operating system and other key operational programs.
3. A tool kit containing pliers, a wrench, and Phillips and flat head screwdrivers. "I use a nice kit put out by Leatherman Tool Group Inc. (http://www.leatherman.com)."
4. A complete telephone connection kit containing:
   - two RJ-11 extension cords. "If you only have one, the connector is sure to break."
   - an RJ-11 jack box pre-wired with two wires and alligator clips. "There are still hotels out there that do not provide RJ-11 jacks, and you will need to unscrew the wall panel and connect to the wires in back."
   - a line tester for checking reverse polarity and nonoperational test capabilities.
   - a digital/analog line tester.
   - an RJ-11 2-to-1 line splitter.
   - a telephone adapter for travel in the United Kingdom. "Items such as this, that are country-specific, can usually be picked up from the bell captain at a good hotel in the country. Buy it and add it to your kit if you will be returning."
5. A complete electrical power kit—"this should be adapted to the destination"—containing:
   - two extension cords, each with two or three outlets. "Sometimes the only 110 volt outlet is in the bathroom."
   - an international plug adapter kit containing all the various plug adapters.
   - a small 220-to-110 volt transformer. "Sometimes these come in the plug kits, but they are also available in most international airports."
6. A sheet of paper listing critical computer settings, including e-mail and modem configurations.



■ **Just A Few Extra Numbers.** Soon you'll discover that accessing the Internet while you're away from home is like making a long-distance phone call with a calling card. You simply have to punch in a few extra numbers to hear the sound of a familiar voice. Thanks to mobile equipment and far-reaching ISPs, the familiar sites of the Internet are only a few extra numbers away. LS

by Jeff Dodd

TI DSPs.
Continuous
access to
the world of
digital music.

TI DSP. A technology that brings music from the Internet into our homes with MP3, SDMI, ePAC™, AAC or any standard. Then takes it into the future with a new generation of products like digital radio, which provides CD sound from traditional radio stations. • More important, TI programmable DSP is a technology that is always connected to the future. As newer generations evolve, you're always just a software download away. So rather than retool and replace, you can simply reprogram. • TI programmable DSP is also a network of third-party companies working to invent new applications not yet dreamed of. It's a legacy of leadership that can give you a clear advantage. It's a broad portfolio of TI analog that delivers real-time connection to the real world. It's eXpressDSP™, our Open Software Environment that opens new ideas. • It's what all the noise is about. • Texas Instruments Digital Signal Processors. Powerful. Programmable. Engines of Intelligence. ▶ **www.ti.com/dsp**

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TEXAS INSTRUMENTS

Make An Online Telephone Call

Using Computers For Voice Communication

What item sits on your desk and lets you make phone calls around the world? Your computer, of course. Sure, you could just pick up the telephone handset, but in many situations, making a phone call that originates from your computer may be the better option.

Saving on long-distance charges, keeping an automatic log of your calls, and being able to speak over a modem line while another household member is using the telephone are just some of the reasons why you should consider using your computer for voice communications. So, with that in mind, let's take a look at two ways to use your computer to make a phone call: Windows Phone Dialer and Internet or IP (Internet Protocol) telephony.

Key Points

- Save money on long-distance phone charges by using your computer for voice communication.
- Windows Phone Dialer and Internet telephony are two methods you can use to make a phone call with your computer.
- Despite a few obstacles, Phone Dialer and Internet telephony offer some useful features that the telephone does not.

Phone Dialer Overview. Phone Dialer is a software program built in to all Windows 95 and Windows 98 operating systems; a similar version is also included with Windows NT. Phone Dialer won't take the place of a telephone, but, as you might guess from the name, it dials a remote number by instructing the computer to tell the telephone (via a standard modem) to make a call.

Here's how Phone Dialer works. You launch the software, enter the digits of the telephone number using a computer keyboard or pointer placed on the software's interface, and click a button. You then listen as the computer dials the number. Next, lift the receiver, press a button on the software, and immediately you're talking to someone on the other end. When you're done, simply replace the receiver and click another button on the software to hang up.

While this may seem like a case of technology overload, the process is slightly more complicated than using the telephone keypad and it takes slightly longer. Even so, Phone Dialer does offer several useful features that the telephone doesn't. One such feature is the call log, a system that tracks every call you make with Phone Dialer. It records such information as the phone number, the name of the recipient, the time you made the call, and how long the call lasted. If you want a handy record of phone calls, perhaps in order to track a particular project at work, the log can be a great tool.

Another advantage of Phone Dialer is that it offers a convenient way to store and use calling card data. No longer will you have to remember PIN (personal identification number) codes and double-digit access codes. Instead, type in the information for each calling card and instruct the computer to use that card when making long-distance calls. You can input multiple calling cards, as well.

Phone Dialer also features speed dial buttons. The application lets you program up to eight numbers and select them by clicking a button on the opening screen of the software.

Plus, Phone Dialer can be a useful troubleshooting tool. Suppose you're having trouble logging on to the Internet, and you don't know if the problem lies in your modem or at the ISP's (Internet service provider) end. To test whether it's your modem at fault, you can launch Phone Dialer. If the application doesn't work, the problem is probably with either your modem or your telephone connection.

Overall, however, Phone Dialer is a relatively simple application that doesn't offer many of the features that commercial products do. For instance, you can configure other products to dial all numbers in a database and use a spreadsheet to track the contacts you were able to contact. If you plan to do heavy dialing from your computer or need to manage business contact information, you may want to look into obtaining a copy of a more robust piece of software.

■ **Logging Calls.** As we said, one feature that makes Phone Dialer indispensable is its call log. To demonstrate what we mean, we'll explain its benefits by using an example.

Jane Doe is an attorney who relies on the call log to help her keep track of her time and expenses. When she initiates a call via the Phone Dialer, it prompts her for the name of the other party, and the software automatically keeps track of the rest, including the number she dialed, the time of the call, and most importantly for her billing purposes, the duration of the call. Once a week, when filling out her timesheet, Jane opens the call log by selecting Show Log from the Tools menu. She tallies up her minutes and charges them to the appropriate client.

Jane's paralegal, Bob, who telecommutes three days a week, also uses the Phone Dialer to make work calls from his home computer. But rather than using the log to track time, he relies on it to keep tabs on which calls are made for his employer and which are for personal use. After he receives his monthly phone bill, he checks it against the log so he can record the appropriate calls on his expense report.

■ **Using The Phone Dialer.** Ready to try out Phone Dialer? The first task, a relatively simple one, is to set up the hardware. Your modem should already be working and communicating properly. For the purposes of this example, our modem is set up on a Win98 system. Next, gather two standard telephone cords and locate the two connectors on the modem. Plug one end of one cord into the jack on the modem labeled "phone" and plug the other end of that cord into the back of your telephone. Then plug one end of the second cord into the jack on the modem labeled something like "line" or "telco," and plug the other end of the cord into the jack in the wall.

Now it's on to the software. The default version of Win98 includes Phone Dialer, so you probably won't need to install the software. To check whether Phone Dialer is on your system, click Start, Programs, Accessories, and Communications, and look for the program. If it isn't there, locate your Win98 system CD-ROM, open the Control Panel (just double-click the My Computer icon on your Desktop to find the folder), and double-click Add/Remove Programs. Open the Windows Setup tab, choose Communications, place a check mark in the box next to Phone Dialer, and click OK. On the next screen, click Apply and follow the on-screen instructions.

Now you're ready to make your first call. Open the software via Start, Programs, Accessories, and Communications. The Phone Dialer is quite intuitive. To make a call, either place the mouse pointer over the on-screen keypad and click the numbers you need or place the pointer in the Number To Dial field and type the numbers in via the keyboard. Then, click the Dial button and type in the name of the recipient in the dialog box to add the call to your log. You'll hear the computer dial, and when the person you're calling picks up the phone, click the Talk button on your software to respond. When the call is over, just click the Hang Up button.

To add speed dial numbers, go to the Edit menu and select Speed Dial. Type in the phone number and the name of the person you wish to add to the directory, for up to eight different contacts, and click Save to record this information.

The Tools menu is where you can configure other properties, such as how to connect to an outside line from within a PBX (private branch exchange) system or how to set up different profiles for notebook users who might be dialing from various locations and area codes.

Several companies have developed Internet telephony products, but they haven't always cooperated with one another to develop standards (and they still don't). Often one program is incompatible with another.

■ **Internet Calls.** Computers can do much more than simply dial a telephone number, too. Users can use computers to conduct entire telephone conversations, from start to finish. Thanks to the growth of the Internet, millions of people are making calls from their PCs by contacting other computers and telephones.

Welcome to the world of Internet telephony, where telephone calls transmit over the Internet. Internet telephony, which is often referred to as IP telephony or VoIP (voice over IP) even though there are some technical differences, refers to the act of using the Internet to transmit voice data. In other words, your PC turns into a quasi-telephone.

The thumbnail sketch looks like this: You open up software and instruct it to call a remote PC or

telephone. With the connection established, you speak into a microphone, and the voice of the person you called arrives over your computer speakers. The other person may be on a telephone, or he or she may also be talking via a computer.

Behind the scenes, the Internet is acting as a huge pipe, carrying data that transforms from sound into data so it can travel along the pipe, and then later transform back into sound. When you speak into the microphone, the analog data (your voice) is digitized (turned into strings of 0's and 1's), split into packets (packetized), and then transmitted via the Internet. When it arrives at the other end, it is depacketized and transformed back into analog data, so the recipient hears sound. As complicated as this might seem, the process takes place in seconds, so there's only a slight delay when talking.

Phone Dialer, bundled with Windows 95 and Windows 98 systems, is a software program that lets you dial a phone via your computer.

But this slight delay isn't the only difference you're likely to encounter when using the Internet to make a phone call. Human speech is quite rich and full, so converting it into digits means that a great deal of data is needed to represent each word and phrase. Because these chunks of data are so big, they must be compressed in order to transmit over the Internet. On the other end, when they reach their destination, the data must then be decompressed. Inevitably, some of this data gets misplaced in the process, and because the Internet wasn't originally designed with this type of data transmission in mind, the connections may not be as fast as needed for high-quality transmission.

In addition, there are some other difficulties with making calls via the Internet. A telephone line is dedicated, meaning that when a connection is established between two parties, the line carries those voices—and those voices only. But with the Internet environment, transmitted data competes with other data for space (ideally the space is shared, but sometimes the system acts like an unmanageable pre-schooler), so the sound might come through in stops and starts.

Moreover, inherent technological problems are joined by a man-made one. In the past five years, several companies have developed Internet telephony products, but they haven't always cooperated with one another to develop standards (and they still don't). Often one program is incompatible with another. This situation is changing, but before you attempt to call another PC, you need to make sure the two programs on both ends can talk to each other.

Given all the drawbacks to making a call over the Internet, you might wonder why anyone would bother. But there's one main reason why people use Internet telephony, and it is a significant one: saving money.

Consider for a moment what you pay to call from one region of the country to another. Long-distance charges may cost anywhere from 5 to 10 cents a minute or much higher, especially if you're being charged business rates. But since calls from your computer are being routed over the Internet, many services are completely free; all you have to pay is whatever local charges, if any, apply.

While there has been concern in the industry that the government will eventually step in and regulate Internet telephony (possibly leading to higher costs for the consumer), PC-to-PC calls, for the most part, remain free. Factor that against the occasional sketchy connection, and skipping the telephone and calling someone from your computer can be quite appealing.

PC-to-PC calls are just one of three main categories of Internet telephony. With PC-to-phone calls, you can use your computer to call those who don't have computers; all they need are telephones or fax machines. There are even programs that let you make phone-to-phone calls that are transmitted in part over the Internet, although these tend to be more expensive than PC-to-phone calls. In turn, PC-to-phone calls are generally more expensive than PC-to-PC calls.

■ **Using Internet Telephony.** To make a call from your PC with Internet telephony, you'll need a bit more equipment than you do for simply enabling the Phone Dialer. Thankfully, when it comes to hardware, computers sold nowadays are usually equipped with high-quality sound capabilities. To make a PC-to-phone call, you'll need a sound card

Terms To Know

analog—Refers to an electronic device that uses a system of unlimited variables to measure or represent the flow of data. Radios, for example, are analog because they use variable sound waves to carry the data from the transmitter to the receiver. In contrast, digital electronic devices use a limited, predetermined numbering system to measure or represent the flow of data. Think of digital as a staircase and analog as a ramp. An analog value can be at any height along the ramp. A digital value can only be at a height that matches a stair step.

data compression—Any method of condensing information so it can be stored in less space or transmitted in less time. Users often compress large graphics and sound files so others can download them faster. Although data compression can be done in many ways, a compression program generally looks for redundancies in a file, then compresses the identical pieces of data into one representative token.

digital—An electronic device that uses a limited, predetermined numbering system to measure or represent the flow of data. Modern computers are digital because they use the fixed binary digits of 0 and 1 to represent all data.

telephony—Technology that lets users use a PC, with the aid of hardware peripherals and software, to make and receive telephone calls. Telephony software often includes features such as voice mail, auto dialing, and on-screen messaging. Telephony is when sounds convert into electrical signals as they transmit to another location. Once at the designated location, the signals convert back to sound.

and speakers, and most new computers either come with them or offer them as a low-cost option. To speak into the computer, you'll need a microphone, which costs only a few dollars. (Some software providers also provide headsets.) If these pieces of hardware aren't already installed on your system, consult the appropriate manuals for instructions on installation and configuration.

The trickier aspect of this process is choosing what software to use. There are dozens of products on the market today, so before rushing out and buying what your brother-in-law recommends, take a deep breath and consider a few questions: What type of calls will I be making? (to another PC? to a telephone?) How much am I willing to spend? (The software is often free, but pricing plans vary widely.) And most importantly, whom will I be calling? (Since so many programs are noninteroper-able, it's important to know that the remote PC's software is compatible with yours.)

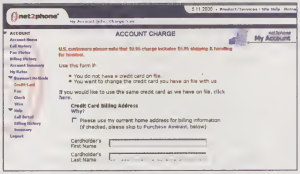
Some notable companies in the market are VocalTec Communications (http://www.vocaltec.com), a pioneer in the Internet telephony industry; deltathree.com (http://www.deltathree.com), a company that offers free PC-to-phone calls anywhere in the United States and Canada; and Microsoft, with its NetMeeting conferencing software (http://www.microsoft.com/windows/NetMeeting) that relies on Internet telephony for audio transmissions.

For our demonstration, however, we'll walk through using a service from Net2Phone (http://www.net2phone.com), a company that offers a range of Internet telephony products. First, we'll start with the PC-to-PC application. If you don't already have Net2Phone on your computer (it is bundled with the Netscape 6 Web browser), visit its download center (http://www.net2phone.com/net2phone) and click the download link toward the top of the screen. And since Net2Phone is required on both ends of a PC-to-PC call, find a friend who uses the software (or convince one to try it out with you.)

After the download, Net2Phone will guide you through the installation and registration process. A key part of registration is choosing a nickname, and because your nickname is linked to your account and you must have a nickname in order to receive PC-to-PC calls, be sure to write it down.

During registration, you can choose to add funds to your account, and if you plan on making other calls besides PC-to-PC calls, you may want to provide funding from the beginning when you set up your account. Calls from your computer to telephones and fax machines cost anywhere from less than 4 cents a minute for domestic and European calls to 22 cents a minute for calls from the United States to Zimbabwe, for example. Calls to other computers are free, however; so for your introduction to Net2Phone, we recommend that you skip the step of adding funds to your account until you've tried out the software by calling another computer.

With Net2Phone, you can transmit calls from your computer to other computers or telephones.



Before making some types of Internet telephony calls using the Net2Phone application, users must first purchase "time" at the Net2Phone Web site.

When you're ready to make the PC-to-PC call, make sure your friend has given you his or her nickname and that he or she is online with the software open. An e-mail message sent in advance or a brief telephone call is all that's needed to arrange this. (Or you can try "calling" until your friend is logged on but that might get frustrating.)

Now, go ahead and launch the Net2Phone software. The software resembles a telephone interface, with a keypad and display line. Since we're going to call a computer, locate the PC2PC button at the bottom of the software and click it. The software will then prompt you to enter the nickname of the person you are calling, and after typing it in and clicking OK, the software goes to work. Within seconds, the display screen will either show that you have connected or that the party you are trying to reach is not logged on.

If you're on the receiving end of a call, open Net2Phone (you can minimize it so it doesn't take up Desktop space) and listen for your phone to ring. When your phone starts ringing, simply click the Call button on your software to answer the call.

To contact someone who doesn't have Net2Phone, take advantage of Net2Phone's PC-to-phone calling feature. Before making the call, you need to add funds to your account, and one of the easiest ways is to do this is go to the site's Interactive Account Center (https://ocs.net2phone.com/account/myaccount/english/login.html). From this page, charge a predetermined amount (the minimum is $25) to your credit card. If you have questions, call Net2Phone at (800) 438-8879 or (201) 530-4000.

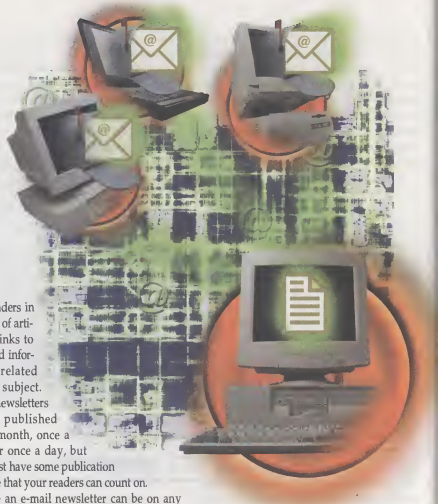
Once you have funds set up, open the Net2Phone software and enter the phone number in the display bar by using the numbers on your computer keyboard or by using your mouse to click the Net2Phone on-screen keypad numbers. Finally, click the big Call button, and, provided you have money in your account, you'll be prompted to proceed with the call. When the call is over, click the Hang Up button or click the ESC key on your keyboard.

■ **Over & Out.** No matter which method you choose, the good news is your computer can save you money on your long-distance charges. Plus, making phone calls via your computer makes it easier to log your calls, store and use calling card data, and troubleshoot poor Internet connections. So, you better treat that little asset on your desk with some respect. The more you find out about its capabilities, the more important it becomes. LS

by Heidi V. Anderson

Create An E-mail Newsletter

Find A Niche, Share Your Interests



E-mail is the one thing everyone uses online; it's been called the "killer app" of the Internet. Because e-mail is so widely available, it's a great resource for publishing and reporting.

Maybe you've always wanted to be a publisher, but you didn't happen to inherit a newspaper. You might have a subject that you love to talk about, a hobby or some other personal interest. Or perhaps you run a business, and you'd like to stay in better touch with your customers and make sure they know about special sales or new items you have available. E-mail newsletters can serve all these needs.

Publishing an e-mail newsletter requires a definite commitment of time and energy, but the rewards can be substantial, both in recognition for your knowledge and hard work, and in money made from advertising or business referrals.

What Is An E-mail Newsletter?

An e-mail newsletter is a form of publishing. As the publisher, you provide content to your readers in the form of articles or links to news and information related to your subject. E-mail newsletters may be published once a month, once a week, or once a day, but they must have some publication schedule that your readers can count on.

While an e-mail newsletter can be on any subject, it must have some kind of focus. Look for a niche for your newsletter to fill. If you love guinea pigs, for example, you might want to publish a newsletter about guinea pigs, giving information about their habits, how to care for them, and what kind of problems to watch out for. If you are in a certain business, such as providing lawn care, you might publish an e-mail newsletter discussing different kinds of grass, lawn care, or tools that your customers might like to purchase.

The e-mail newsletter will reflect you, your personality, and your concerns. Your audience will be those individuals who share your interest or who use your business or service. As your audience grows, you will get feedback from them about what works or doesn't, what they like or what they want to read more of. Your e-mail newsletter is like a living, growing thing that changes as you send out your own choices of reading material and your readers respond to it.

Many people who publish newsletters come to love this publishing process, and e-mail newsletters, also known as "ezines," have a passionate following online.

Key Points

- E-mail is a great resource for publishing and reporting.
- Publishing an e-mail newsletter takes time and energy, but the rewards can be substantial.
- Mailing list administration can be handled automatically using one of many free or fee-based services.
- Be sure to adhere to copyright restrictions and follow our formatting tips to make sure readers see a desirable finished product.

Choosing A Subject.

Simply put, the best subject will be something you love, something that you want to devote time to writing about and reading about. The subject should be one you already know a great deal about, or at least one you know you can learn about easily. You will also want to find a subject that has enough depth so that you can explore many facets of it over time.

You may already have a subject in mind. Your family, your hobbies and crafts, your garden and pets, or your business and work can all provide material for an e-mail newsletter. But if you want your newsletter to gain many readers, you'll probably want to find a niche that isn't already full of other newsletters.

Check out the many ezine and newsletter announcement lists (online directories) to see what other newsletters cover the same subject. The directory at http://www.ezineseek.com or the e-mail newsletter archives kept at http://etext.org will give you a feel for some of the subjects covered by e-mail newsletters. There are also Usenet groups devoted to the subject, often mixed with other forms of online publishing. You can find lots of tips by reading alt.zines, alt.ezines, alt.etext and rec.mag.

Don't be discouraged, though, just because there is already a newsletter (or more than one) devoted to your subject. Depending on what your topic is, there may be plenty of interest in another newsletter with another point of view. Read the competition—the other newsletters devoted to your subject. You may well discover that there are areas they don't cover or that you could cover better. While you may want to look for a topic that no one is covering now, you may decide to stick with a subject you love just because you love it, no matter how many other people are writing about it as well.

In the end, your own commitment will determine how successful your newsletter is. The process of building a subscriber list has to be grounded in the quality of your work, in your commitment and consistency as you publish over time. If you publish a newsletter of consistent quality, your readers will gain trust in your work and will look forward to reading what you provide.

As you publish more, you may build a reputation as an expert, a person whose information can be trusted. If you aren't really interested in the subject, and you aren't prepared to work consistently on your newsletter, you won't succeed. So make sure that the subject you choose is one that will keep your interest over time.

■ **Getting Started.** Once you are sure what subject you want to cover, and you've looked at some of the competition, you should start with one or two test issues of your newsletter. Ask your friends, family, or coworkers if they would be willing to read your newsletter and give you some feedback on it.

In the beginning, you're trying to come up with a format and design for your e-mail newsletter that will work for you over time. At this stage, you're trying to get a feel for how much work you will have to put in to producing your newsletter and what kind of features will appeal to your readers.

Feel free to experiment, especially in these early testing stages. While there are some standard newsletter features that you'll want to provide, such as a header with your newsletter name, other parts of your newsletter can vary enormously. You may test a section of product reviews only to find that you hate writing them or that no one wants to read them. Your readers may tell you that they loved the useful tips on keeping your guinea pig's case clean but were bored with your essay on the historical significance of guinea pigs in ancient France (or vice versa). In any case, this early feedback will be invaluable.

Publishing a few test issues will give you a good feel for how much work will be needed to publish your newsletter. And while you'll continue to add and remove sections over time, you'll feel more confident with your publication if you've tested your writing first.

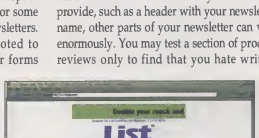
■ **The Subscription List.** When you publish an e-mail newsletter, you have to take on several jobs, and one of them is administrator. Every e-mail newsletter needs a subscription list, a list of all the people who want to read your newsletter with their e-mail addresses attached. People will want to join your list (subscribe) and leave it (unsubscribe), and you will have to make sure that they can do either one promptly and easily. At first, while the list is small, you can enter your subscribers by hand in almost any piece of e-mail software. You'll want to make sure that the mailing addresses are sent using the BCC (blind carbon copy) function so that the entire list of addresses isn't published as part of your newsletter. Your subscribers won't be happy if you send their e-mail addresses to everyone on your list.

Once your subscriber list grows to a few hundred names, you may find that you're spending more time doing administrative tasks than you are spending on the newsletter itself. If your time is tight to begin with, the burden of handling your subscriber list by hand will quickly become overwhelming.

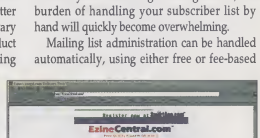
Mailing list administration can be handled automatically, using either free or fee-based mailing list services. Mailing list services treat e-mail newsletters differently than they do standard mailing lists. In a regular mailing list, any list member can send messages to the entire list. This kind of mailing list works more like an ongoing conversation than a publication. For e-mail newsletter, mailing list services design the list so that only one person (you, the administrator) can mail information to everyone. In either case, the mailing list software handles subscription requests and some other requests automatically, so the administrative burden is much less.

There are free mailing list services that you can use to process your newsletter mailing. The most popular and well-known of these is OneList (which recently merged with Egroups, another popular list server). The disadvantage of a free service is the fact that they will append advertising onto the bottom of your mail. Additionally, in order to use a free service, your subscribers have to sign up through that service's own Web site. This could make it harder to get subscribers, since there is extra registration involved

You can also pay for e-mail services, and the cost of those can range from a few dollars a month to hundreds of dollars a month, depending on how large your list is and what services you require. These services will not append anything to your newsletter. Subscribe and unsubscribe requests are handled by an e-mail autoresponder, so there is no separate



You can learn more of the common terminology for ezines and newsletters at ListLingo.com



EzineCentral.com is one of several sites that lists e-mail newsletters and other online publications in directory form.

registration process to bog things down. Most e-mail newsletters eventually end up running either through a pay service or on the owner's own host server, for just this reason. Lyris (http://www.lyris.com), SparkList (http://www.sparklist.com)and L-Soft (http://www.lsoft.com) offer fee-based newsletter services.

No matter how you choose to handle your subscriber list, some administrative tasks have to be handled by a real person. For example, e-mail will bounce back from invalid addresses, or customers will require attention. Make sure to plan for these kind of administrative duties in your schedule.

E-Zinez is one of many sites that offers tips on e-mail newsletters and other online publications.

Chris Knight's Stop-Spam site can educate you on why spam is such a hated online phenomenon.

■ **Newsletter Production.** After administration, the next task will be production. Producing a newsletter through e-mail involves many of the same considerations as producing any other kind of publication. You have to think about layout and design and how to best present your content so that people find it visually attractive and can easily read it.

While it is possible to publish e-mail newsletters in different formats, most are published in pure ASCII (American Standard Code for Information Interchange) form. ASCII characters consist of the basic letters and punctuation found on an ordinary keyboard. ASCII is used for nearly all e-mail newsletters because it allows the newsletter to be read accurately by any e-mail software. When you use "extended characters," which are the special characters (like bullets) not found directly on the keyboard, they will be rendered differently in different software, and in some cases can't be read at all.

E-mail newsletter publishers have learned to be quite creative in using ASCII to define a style of their own, but it's definitely more limiting than using a format that allows graphics, bold type, or various fonts. ASCII is usually presented in a monospaced font such as Courier, which looks like text produced by an old-fashioned typewriter. When your presentation type is so plain, the content takes center stage. You have to grab people's attention with your writing, since you can't lean on colors or pictures to help you out.

If you know that your audience will always be made up only of people using graphical e-mail software, you can produce your e-mail newsletter using HTML. HTML (Hypertext Markup Language) is the language used for creating Web pages. Basic HTML is not hard to learn, but once you decide to make your newsletter in that format, you will definitely be eliminating a large part of your potential readership.

Another way to publish your e-mail newsletter is by producing it as an Adobe Acrobat, or .PDF, file. Acrobat files are produced as a kind of graphic, and this preserves the entire look and layout of your newsletter just as a printing press would. Adobe provides a free Acrobat reader that anyone can use. However, .PDF files tend to be quite large, so people with slow Internet connections can't easily download them. Also, the extra step of having to get and install the Acrobat reader will lose a segment of readers who just don't want to bother.

Some publishers produce their newsletters in more than one format so that people who like HTML e-mail can receive the newsletter in that format, and those who prefer ASCII can have the newsletter in that form. Many publishers e-mail their newsletters in ASCII format but also keep a Web site that uses HTML. The Web site might contain an archive of old material, a search engine, or extra content. Used in this way, the e-mail newsletter and the Web site can drive traffic back and forth. Having both can also provide additional income through advertising impressions or page-views.

Any time you move beyond the ASCII format e-mail newsletter, of course, you're talking about more time and work to be done. Only you can decide how big you want this project to become, and whether you want only a newsletter, a Web site, or both.

Newsletter Ideas

- Gather news from family members and send out a monthly report to everyone.
- Report on your favorite sports team or list game scores and upcoming game schedules.
- Teach other people about any subject you know and love, such as history or natural science.
- Use an e-mail newsletter to inform your customers of upcoming sales or write articles that will help them shop wisely.
- If you have a form of entertainment that you enjoy, such as books or movies, you can write book or movie reviews that others can use when they're deciding what to read or see.
- Make people laugh! If you like to make jokes or if you draw funny cartoons, people may enjoy reading or seeing your work.
- Connect with other people your own age. Whether you are 16 or 60, there's probably information that others your age can use.
- Share your love of music. Report on concerts you attend or bands you like.
- Report news related to your culture or religion. There may be lots of information that doesn't get reported in the mainstream press.
- Share upcoming events or important local news with your town or neighbors.

■ **Formatting.** If you use traditional ASCII type for your e-mail newsletter, there are a few formatting issues you'll need to be aware of. First, make sure you put a hard return at the end of your lines and that each line is no more than 60 or 65 characters long. This ensures that your line lengths will work on the widest variety of e-mail software, and that your lines won't get broken or spaced oddly, making them hard to read.

Also, your entire newsletter file should be no more than 24KB (kilobytes) in size. Some popular Internet providers, such as AOL, break up e-mail that is larger than 24KB and send it in several pieces.

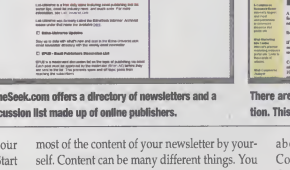
Make sure your text is arranged so that it is easy to read. Use lines of ASCII characters to separate articles or sections of your newsletter and use hard returns to create enough white space so that your newsletter doesn't look too crowded. Use headlines on your articles or on your regular sections to make it clear where each piece begins and ends. You want your headlines to be creative but not confusing. Start off with your most interesting information or with a teaser to an article further on. When your e-mail newsletter arrives in someone's mailbox, you want them to be drawn into reading it rather than just tossing it aside.

You'll want to develop a template for your newsletter, a basic form that you will use every time you create an edition. The template will always include your masthead, the text or graphic at the top which says what newsletter this is. The masthead also includes information such as the publication date and the volume and number of this issue (The volume number is usually a year, and the issue is the order of publication within the year, for example Vol. 1 Iss. 1 is your very first issue).

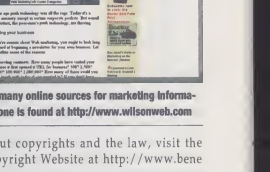
Also, make sure that the information needed to subscribe and unsubscribe to your mailing list is in your template, as well as an e-mail address where you can be reached. Most e-mail newsletters gain readers when people send on copies of the newsletter to their friends and coworkers. You want to make sure that anyone who sees your newsletter knows how to subscribe, and that your readers have an easy way to send you comments and questions.

When you publish in ASCII text, you'll probably be better off using a text editor rather than a word processor. For example, the Windows program NotePad is a text editor. It does not add or display extended characters in your file. On the other hand, word processors such as Microsoft Word or WordPerfect will not only add in extended characters, but unless you specifically tell them otherwise, they will save your work in a proprietary format.

■ **Content & Copyright.** At least at the beginning, you'll probably end up creating most of the content of your newsletter by yourself. Content can be many different things. You can write news reports, opinions and essays, Web site reviews, or product reviews. You can publish tips and how-to guides or provide links to material online. If you can't think of anything to write about, then your e-mail newsletter isn't going to last for long.



EzineSeek.com offers a directory of newsletters and a discussion list made up of online publishers.



There are many online sources for marketing information. This one is found at http://www.wilsonweb.com

Visit Web sites or message boards where people talk about your subject and see what things are on their minds. Then address those questions or concerns in your newsletter. Don't be afraid to inject some personality. Write concisely and clearly. Many of us find that writing short articles is harder than rambling, but most people aren't going to read a lengthy article on their computer screen. Look at other newsletters and see how their articles are proportioned, then adapt their styles to your own needs.

Over time, you may find friends who will write material for you, or your readers may send in letters or other useful content. If you become successful enough to make money from advertisers, you can begin to pay yourself or others to write content for your newsletter.

There are also some sources of material online that you have permission to use. List Resources keeps an index of possible sources for newsletter content at http://www.list-resources.com. Another such list is at Ezine Articles (http://www.ezinearticles.com), and others are listed at the About.com publishing guide site, at http://publishing.about.com/arts/publishing/msubnewslettercontent.htm.

You do need to understand a little about copyright law in order to publish your e-mail newsletter. You cannot use other people's work if you don't have permission. If you use work without first getting permission, you could end up on the receiving end of a lawsuit. At the very least, you'll get a bad reputation. To learn more about copyrights and the law, visit the Copyright Website at http://www.benedict.com.

Copyright protects you, too. Make sure that the copyright information for your newsletter is included with each issue. That way, when someone forwards a copy of your newsletter to their friends, you and your contributors will be properly credited for your work.

When you include URLs (universal resource locators) in your newsletter, make sure that the links are current and that there are no typos. Most modern e-mail software can turn URLs into hot links, but this will only work if you have provided the full address (including http:// or ftp:// or some other header at the beginning, to specify what kind of connection the browser should make). If you have word wrap turned on in your text editor, long URLs may get broken onto two lines, and the link won't work.

You may want to keep an archive of your old newsletters available for browsing. You can do this on a Web site if you have one or through an organization such as EText http://www.etext.org. EText provides electronic archives of many publications, including newsletters.

■ **Publicity & Advertising.** Publishing an e-mail newsletter can garner attention,

enhance your reputation, bring in extra sales or work contracts, and even make money directly through advertising revenue. If your newsletter is good enough and attracts enough readers, you could become something of a star in your field.

How can you go about attracting readers to your work? There are some definite dos and don'ts for e-mail publicity.

List Resources has articles to teach you all aspects of online publication and also links to many other useful sites.

First, make sure that your newsletter is announced on the ezine announcement lists and in the appropriate newsgroups. The newsgroups were mentioned above, but you should read each group for a while to make sure you understand the etiquette for posting to the group. If you take the time to learn how to post appropriately, people will be much more gracious and helpful to you. A good list of announcement services is part of the discussion on "How to Publicize and Promote Your Ezines," at ZineBook. Visit this page at http://www.zinebook.com/publicz.html.

A few other directories can be found at EzineUniverse.com (http://www.ezine.com), EzineSeek.com (http://www.ezineseek.com), and EzineCentral.com (http://www.ezinecentral.com). Each site has its own process to follow if you want to be added to its directory; check the sites for information.

Most of your subscribers, after the initial few, will come from word-of-mouth. This is why it is important to have subscription information placed prominently in every issue. But make sure you include directions on how to unsubscribe in every issue, too. Presumably you are not trying to annoy people or to create more work for yourself, so make it easy for people who aren't interested to leave your list.

Along the same lines, remember that you don't want your newsletter to be regarded as spam, which is unsolicited (usually commercial) e-mail. Your reputation will definitely not be enhanced if you try to get people to subscribe by signing them to your mailing list without permission. Let people opt in to your mailing list. Then they only receive your newsletter if they want to receive it. A decided and loyal group of readers will be your biggest asset, so make sure that your readers are happy with your service.

Once you have your regular readers and a growing subscription list, you may be able to make some cash for your hard work by selling or swapping advertising space. Ad swaps are more common between newsletters that want some simple publicity. But there are advertisers who may eventually want to pay for space in your newsletter to gain publicity for their own businesses.

You will probably never want to have more than two or three ads per issue, as your readers will get annoyed if the ratio of ads to content gets too high. Some popular newsletter publishers, such as Debbie Ridpath, editor in chief and publisher of Inklings, a newsletter for writers, says, "I don't really find my advertisers. They find me. I've never aggressively sought out advertisers." Inklings also grew to nearly 50,000 subscribers strictly by word-of-mouth, proving that if you have a good product that fills an important niche, you can be successful even without pursuing publicity.

For more information on handling advertising, a subject that is beyond the scope of this article, check out A Manager's Guide to Newsletters at http://www.managersguide.com and the List-Resources' Advertising & Revenue section at http://list-resources.com

Publishing an e-mail newsletter takes consistent hard work, but it can be rewarding in many ways. Use the resources and tips listed in this article to publish a newsletter that will make you proud. LS

by Jennifer Powell

Terms To Know

ad swap—an agreement between e-mail lists or Web sites in which each runs an ad for the other's newsletter or site

announcement list—an e-mail list or Web site that posts information about newsletters and ezines as they start up.

ASCII (American Standard Code for Information Interchange)—The basic typewriter keyset. These codes can be viewed in any e-mail client, unlike "extended character sets" which will display differently in different software.

autoresponder—Software that responds on its own to a request from a list member, such as a request to subscribe or unsubscribe.

BCC (blind carbon copy)—When you place someone's name in the BCC field of an e-mail message, they receive a copy but their name does not appear on the "To" list.

confirmation—A message sent to let someone know that their request has been performed, for example, a welcome message telling someone they are now subscribed to your mailing list.

impression—Each viewing of an ad banner is considered one "impression."

List server—The machine and software that automatically run a mailing list.

opt in/opt out—Two different strategies for subscriptions to a mailing list. Opt in means that a person must actively subscribe to receive the email, and opt out means they receive e-mail unless or until they unsubscribe. Opt out is the more intrusive means of list subscription.

spam—Unwanted or unsolicited commercial e-mail. Also used as a verb, "to spam" a person means to send them unwanted e-mail.

subscribe—The act of joining a mailing list.

unsubscribe—The act of leaving a mailing list.

Set Up A Discussion Forum

Give Your Web Site's Readers A Sense Of Community

Sometimes, having a Web site isn't enough. Once the glow of the initial accomplishment fades, you may realize you could be accomplishing more with your site. It's not that the site could be cooler, with flashier graphics or the latest sound effects. It is more about supplying your Web site's readers with features that give them the ability to participate in meaningful interactions with other readers.

Sure, your Web site makes it easy for you to relay news and information to your friends, family, fellow club members, or whomever your audience may be. And yes, it's easy to put a simple e-mail link on your home page that makes sending e-mail to you a trouble-free process for your site's readers. However, if you want a sense of community among the visitors to your site, you need an area where visitors can talk to one another and discuss things that matter or just have fun together.

A chat room or discussion forum of some sort is the perfect solution. However, you've probably never seriously considered one because you thought only big sites with lots of resources and technical skills could produce and maintain the needed tools. If so, it's well past time to take another look; implementing a discussion forum of some sort is well within your reach.

The Three Community Tools.

There are three basic community-oriented features: chat areas, message boards, and e-mail lists. Let's take a brief look at each before discussing how to add the functionality of each one to your Web site.

Chat. Chat refers to real-time conversation. (**Real-time** refers to a computer-related operation that occurs within a time frame imposed by external conditions. Real-time operations either happen in a human's perception of the normal passage of time or proceed at the same speed as a physical or external process.) All participants must be online at the same time and logged into the same chat area. Each person types his or her part of the conversation onto the screen to have it appear then and there for all the participants to read and respond to.

Chat is in many ways the most personal form of online mass interaction. Just as the name implies, it has the feeling of folks sitting in a room together, conversing about whatever they like. In addition, these are fast-paced, short-lived discussions. Lines of dialog may remain on the Web site for a few minutes, but they soon scroll off and disappear forever.

Message boards. Message boards provide for ongoing discussion without requiring participants to be online together. A person can post a note at any time, and it remains there for days, weeks, or even years, depending upon the amount of storage space the site has available. Others can stop by the message board later, read the note, and post their replies. The first person can stop back minutes, hours, or days later; read the replies; and respond. In this way, the conversation can extend indefinitely.

For that reason, message boards are suited to meaningful discussions of topics that require thought and carefully crafted presentations. But they're just as useful for lighthearted banter among those who can't simultaneously meet online.

E-mail lists. E-mail lists take the conversation away from the Web and put it right into participants' e-mail inboxes. It is a way to send e-mail to an indefinite number of people by using a single e-mail address. Anybody on the list can write a note, e-mail it to the list name, and thus send a copy to everybody on the list.

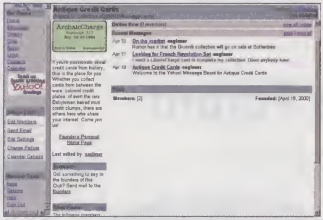
Key Points

- Most small sites don't need fancy, expensive software to add communication features; many Web sites offer these features for free.
- By having discussion tools on your Web site, you let your site's readers participate in meaningful interactions with other readers.
- Site features such as mailing lists, message boards, and chat capabilities give your site's visitors a sense of community.

Although this is often a convenient way for participants to share news and ideas, the trade-off is that heavy conversation among a large number of participants can result in quite a barrage of e-mail for everybody.

■ Let Others Do The Work.

Any or all of these tools may be appropriate to your purpose, and all are easy to add to your Web site. But before you rush out to find the software required to add chat areas, message boards, and/or e-mail list capabilities to your Web site, be aware that much of the software is expensive, and most of the applications require a high level of technical skill to use. You also need to realize that much of this software isn't necessary for the vast majority of personal and organization Web sites. Why spend the time and the money when somebody else has already done the difficult work for you and will give it to you for free?


Antique Greek Cards
Online Now (0 members)
Recent Messages
Apr 13 On the market eaglesar
Rumor has it that Ela Grunnitt collection will go on sale at Sotheranks
Apr 11 Looking for French Republican Set eaglesar
I need a Libertie/Fasigyl card to complete my collection. Does anybody have
Apr 10 Antique Credit Cards eaglesar
Welcome to the Yahoo! Message Board for Antique Credit Cards
Members: [2]
Founded: (April 19, 2000)

Many sites, such as Yahoo! Clubs, will let you set up community tools such as chat and message boards on their servers for free. Just link it to your home page to create a community area.

All over the Web, companies are ready to provide you the tools you need to create your own online community. Known as **roll-your-own sites**, they provide you with such options as your own chat area, message board, event calendar, space for photos, and possibly other features, as well. Providers include such megasites as Yahoo! and Delphi, among others. (*NOTE: See the "Where To Find Discussion Tools" sidebar for more information.*) Many offer the service at no charge and support themselves through banner advertising on their sites. Others are advertising-free sites but charge a monthly fee for their services. The fees can be quite reasonable, especially if you plan to use your site for business purposes.

Whichever way you decide to go, you simply register as a member (registration is usually free) at one of these sites and set up your community site on its server. Then, just place a link to the community site on your existing home page, and you are done with most of the work.

If you think this is cheating or makes your site appear as if you've wimped out, keep in mind that many large sites farm out these functions. For example, About.com, which is a site with several hundred subsites targeting as many special interests, provides its message boards through Delphi. Some services even let you customize the look of your area so it matches the rest of your Web site.

■ Set Up A Community Site.

Yahoo!'s community area, known as Yahoo! Clubs, is fairly typical so we'll use that as an example and walk you through the setup process.

From the main page, http://www.yahoo.com, click the Clubs link or go directly to the clubs area at http://clubs.yahoo.com. If you're already a registered user of Yahoo! Family Accounts, log in. If you're not, click the Sign Me Up link and fill in the registration form. Registration is free. When you complete the form, click Submit This Form. Next, click the Continue To Yahoo! Clubs link.

Look at the topic categories in the Clubs Directory and click the most appropriate one for you. If the focus of your Web site and community is collecting antique credit cards, for example, click Hobbies And Crafts. You'll then have to pick a subcategory. In this case, we would select Collecting.

From here, each page features an additional Create A Club button. Don't be too quick to select it. If this is the subheading where you want your club to be, that's fine, click the button now. First, however, we suggest looking at the new list of subcategories. You may want to

Appropriate Use

Many different reasons exist for using message boards, chatting capabilities, and/or e-mail lists with your Web sites. Keep in mind, however, that most roll-your-own boards or Web sites with additional community tools are more for small, individual Web sites. You should look for a commercial solution, such as Web Crossing (free to $695 and more, depending on what you need; 510/521-5855, 415/771-7099; http://www.webcrossing.com), once you have more than 50 to 100 people using the site if you need accountable reliability, or if you are doing anything commercial. If your use of one of these free applications or Web sites is for one of the following, your use of these free tools is probably appropriate.

Families. Providing family members with online communication tools lets them keep up with the latest news, share photos of the kids or of vacations, talk about family history, or chat together in real-time. (It's like having a conference call with the whole family.)

Friends. You can keep up with your friends from college or your colleagues from that job where everyone was like family by providing them with easy-to-use communication tools.

Support groups. From stay-at-home moms to people with an illness, support groups use message boards and/or chat to lend an ear, get information, and find strength in other's experiences.

Event planning. If you're in charge of a civic event or a neighborhood party, you can get much of the nitty-gritty detail work out of the way between face-to-face meetings using message boards or e-mail lists.

Hobbies and interests. Do you want to find other people who love the same band you do or people interested in travel to obscure parts of the world? Message boards are a great place to meet people with the same interests.

Schools and training. Your class could have its own message board and chat room for group work on projects outside of school. You also could teach some friends about selecting wines by setting up a message board where they could ask questions. ■

go down another level, perhaps into Antiques or even Cards. Keep on going down the levels until you find the place most appropriate to your interest. Then click the Create A Club button at the top of the page.

A window will pop up verifying your information. Make sure you're placing your community in the category you desire and ensure your user name and e-mail address are correct. You'll also have the option of adding this interest to your profile. That means other Yahoo! users with similar interests can more easily find you. There are advantages and disadvantages to this. You could get to meet more people who share your collecting passions, but those who send unsolicited advertising through e-mail can also more easily target you. When everything is correct, click the Email Instructions button.

The purpose of this step is to make sure nobody is pulling a prank on you by signing you up for a club you don't want. So Yahoo! sends you e-mail with instructions on how to proceed. Only the person who has that e-mail address (you) can go beyond this point in creating a club.

You'll see a new page telling you an e-mail is on its way. Leave it up while you go check your e-mail inbox. It may take a few minutes for the mail to arrive. If you just signed up for a new Yahoo! Families account, you'll probably already have a welcoming message in your e-mail inbox. This is not the e-mail with instructions on setting up your club. That will be along soon.

When you find an e-mail called Getting Your Club Started, it will direct you to a new Web page. Go there. That's the form that will let you name your club and choose whether the club is to be listed or unlisted. A **listed club** is free for anybody to find and visit. If you want anyone interested in your topic to be able to drop by, that's the option you want. **Unlisted clubs** are accessible by invitation only. You have to invite each member to join and then manually make each person a member. If you want to restrict access, this is the route for you.

Make sure to read the Yahoo! Clubs Terms Of Service agreement. These are the rules for all clubs, and Yahoo! expects you to know and follow them. If you agree, click Yes! I Accept, and you can begin building your club. If you click No! Forget It, Yahoo! aborts the process and doesn't create your club.

Assuming you go forward, you'll find a page notifying you that Yahoo! has created your club. This page also will tell you the URL (**universal resource locator**; Web address) of your club's home page. Click the URL to begin setting up your community site.

The eGroups Web site lets you set up and control your own e-mailing list at no charge.

You'll find Yahoo! has already created the message board and has placed one message in it: A generic welcome from you, the founder of the site. There also are links to the message board, a place to post photos, a chat area, and a calendar. The first time you click Chat, Yahoo! will ask you if you want to include voice-chat capabilities in your community. If you do, Yahoo! automatically will load the proper software onto your community site.

The link to News will take you to a basic news service page you can modify to display the news most appropriate to your readers. Links is a page where you can post links to other sites you think your members will be interested in. The Contacts section provides a list of your club members with whatever information about themselves they want to include.

More important, however, is the listing of Administration Tools. These are software tools you use to manage your club. You'll be able to add and delete members though the Edit Members control. Here, you also can make other members founders, giving them the same administrative control you have. Be careful whom you select; you cannot take away these privileges or delete a founder, and any other founder you name will share your total control of the site, including the ability to delete it entirely.

The Send E-mail option lets you send e-mail to your entire membership, but this is

Terms To Know

chat—A place online where people gather to talk in real-time. Chat rooms or channels are often electronic places, based on various topics or themes, where people hang out.

host—Also known as a moderator, a host greets newcomers to a mailing list, newsgroup, or other type of discussion forum. This person also answers questions, helps keep the conversation rolling, deals with any problems that arise, and generally helps keep the discussion fun and informative.

mailing list—Internet discussion groups that link people with common interests. Mailing lists use central software to distribute messages to a list of people who sign up for them. People on the list can read all the messages and their responses, and they can send their own responses and messages to the list.

message board—A place online where you can write and leave a post, or message, for anyone to read. Then, others write back and soon a conversation develops. This is sometimes called conferencing.

real-time—Refers to a computer-related operation that occurs within a time frame imposed by external conditions. Real-time operations either happen in a human's perception of the normal passage of time or proceed at the same speed as a physical or external process. Most chats happen in real-time.

virtual community—Collections of forums, sometimes called conferences or message boards, where people gather to talk about various topics. Sometimes these communities are based on or have chat, as well.

not a typical e-mail list. Other members can't write to the entire membership by sending their mail to a single address.

The Edit Settings control lets you post a message and a description on the club's main page. This also is where you'll enter your main Web site's URL (under Your Home Page Address) to make the link back to your home page. Change Picture lets you to post a small photo on your main community page, as well.

■ **The E-mail List.** For quick and easy e-mail groups, there used to be two top choices: eGroups and ONElist. The two recently merged, though, and they continue together under the eGroups name but with more features and greater convenience than was previously available through either group.

In brief, using this service gives you 20 megabytes of storage space to archive your previous mailings. (That holds a lot of e-mail.) In addition, you can easily browse and search through past mailings when looking for old information.

To create your e-mail list, go to http://www.egroups.com and click Start A Group Now. You'll need to be a registered user, so click the Click Here To Register For FREE link. The form is short, and of course, there's no cost to sign up. Do, however, read the Terms Of Service so you know what the site allows and what it doesn't allow. Once you register, click the Start A Group link once more.

Control your e-mail list from the eGroups Web site. Here, you can oversee messages and manage membership.

Now you'll be able to name the group and decide how you want it to run. You can choose whether you want the group to be unmoderated, where members can send whatever e-mail they like; moderated, where you, as moderator, have to approve all messages; or newsletter style, where only you can send messages. Unmoderated groups make for greater and easier flow of information, as well as less work for you. However, a moderated operation lets you protect the group from unwanted advertising material and other inappropriate mailings. Similarly, you can opt to have open membership, where anybody can join, or moderator-restricted membership, where you approve all members.

The following page lets you determine a category for your group. Select whichever seems most appropriate and move on through the subcategories until you find the one where you feel your group belongs. Click the Put My Group Here button. This will take you to a page where you can invite people to become members of your group. This step is optional; you can skip it if you want and return to it at any time.

That's it. You have created your e-mail group. You'll now see a page showing you the URL where all the controls for your group reside. You can post messages from here, but you also can do so by sending e-mail to the address *YourGroupName*@egroups.com. If you have a moderated group, you'll need to visit the Web site to OK the pending messages.

Other controls here let you approve members for the group, discover which e-mail addresses in the group are not properly working, ban misbehaving members, and more. Read the Help section for easy-to-follow explanations of all the controls.

You may now make the e-mail group accessible to everyone who visits your home page. Make an e-mail link just like the link to your own mailbox, but this time link it to *YourGroup Name*-subscribe@egroups.com. By clicking there and filling out the e-mail form that pops up, any visitor to your Web site can sign up for (or, if membership is controlled, apply to become a member of) your e-mail list.

There you go. You have all the technical tools needed to create your community. The rest is up to you. LS

by Steve A. Glaser and Elizabeth Lewis

Where To Find Discussion Tools

If you are ready to set up a discussion forum for your World Wide Web site, turn to the following Web sites for help in adding a roll-your-own community, a mailing list, chat functions, or a message board.

Accessboards
http://www.accessboards.com

Anexa.com
http://www.anexa.com

Beseen
http://www.beseen.com

Coollist
http://www.coollist.com

CustomPost
http://www.custompost.com

Delphi Forums
http://www.delphi.com

eCircles
http://www.ecircles.com

eGroups
http://www.egroups.com

Excite Communities
http://www.excite.com/communities/directory

ezboard
http://www.ezboard.com

LiveUniverse.com
http://www.liveuniverse.com

Multicity.com
http://www.multicity.com/webmasters/index.shtml

Topica
http://www.topica.com

World Crossing
http://worldcrossing.com

Yahoo! Clubs
http://clubs.yahoo.com

small business association dues: $450

payroll & accounting software: $760

office supplies: $150

remembering who you work for:

When you get a MasterCard BusinessCard® with MasterCard Business Bonuses,™* you'll earn miles good on any airline. No blackouts. For details and participating banks, call 1-800-788-1365.

there are some things money can't buy. for everything else there's MasterCard.™

www.mastercard.com

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*Only available through participating banks
Certain restrictions and limitations apply

Install A Web Camera

Make Your Own Live Broadcast

In the past couple of years, live video feeds to the Web have become increasingly popular. Easy access to the Web and cheaper cameras has paved the way for everyone to get in on the act. Whether it's a dorm room (http://www.steve.marlowe.net/webcam), an office (http://www.shift.com) or a goldfish bowl (http://www.netscape.com/fishcam), people are broadcasting everything they can imagine.

Web cameras are surprisingly easy to install and have a number of other uses, including showing pandas in the San Diego Zoo (http://www.sandiegozoo.org/special/pandas/pandacam). Many of today's Web cams come bundled with software that not only facilitates live Web broadcasts, but also digital photos and video clips to include with e-mail, video telephone conversations, and even interactive games and video surveillance.

In order to help you select a Web cam, we will guide you through what you need to know about the hardware and software. We reviewed four cameras, and we'll take you through a setup for your own live Web feed.

System Requirements. Although Web cams are easy to set up and use, there are minimum system requirements your PC must meet. Many cameras require a 166MHz (megahertz) processor, and one we tested required 200MHz. A good rule of thumb is the faster the better. You may not see much difference between 400MHz and 550MHz, but the lower speeds may cause jerky video. You'll need a monitor with 16-bit color, but 24-bit color is recommended. Image and video colors are more washed out with lower color depth.

Because most Web cams use USB (Universal Serial Bus), you'll need an available USB port and a USB friendly operating system, such as Windows 98. If you use Windows 95, you need OEM Service Release (OSR) 2.1 or 2.5. Microsoft's support site warns of potential problems with Win95 and USB (http://support.microsoft.com/support/kb/articles/Q247/9/69.ASP) To resolve conflicts or avoid problems altogether, Microsoft suggests that users upgrade to Win98. Windows NT 4 does not support USB, but Windows 2000 does.

Most Web cams require 16 to 32MB (megabytes) of RAM (random-access memory) and 100 to 150MB of free space on your hard drive, and you'll need a CD-ROM drive to install the software. For video phone calls, you need a sound card, a microphone, and a 28.8Kbps (kilobits per second) or faster connection to the Internet. The slower the connection, the choppier the video.

Features To Look For. Once you're sure your system can handle it, it's time to shop around. Dozens of companies make Web cams of differing image quality, features, and price, but you can get an excellent color camera for between $100 and $150. There are several features you'll want to look for on a Web cam.

Resolution, one of the more important features, is measured in pixels and denoted in width by height dimensions, such as 320 x 240. Pixels are tiny dots that make a grid-like pattern on your computer's screen creating an image. Better cameras display at 640 x 480 but let you choose a variety of settings from 128 x 96 up to 1,280 x 960. The high resolutions are better for capturing still images while the middle and low resolutions are better for video clips.

Look for a camera with 24-bit color depth, which is capable of displaying 16 million colors. Every digital image is encoded with the number of colors it can handle. The more colors available to each pixel, the larger the image file size. Images shift further from an object's true color with lower bit depth.

It takes 30fps (frames per second) to depict true-to-life motion, so the higher the frame rate, the smoother the video. Web cams usually run from 25 to 30fps. Cameras with lower frame rates can be used for nice still shots, but users may become annoyed with the choppy video they produce.

Some Web cams automatically adjust to low-light conditions. If the room with your

Key Points

- A live Web broadcast sends snapshots at timed intervals or streaming video from your PC to the Web, using a Web cam.
- Using a Web camera and the information you'll find here, you can put up your own live Web broadcast.

Web cam doesn't have a window or you'll be using it at night, you'll need to adjust the image or it'll be too dark to see. The ability to adjust contrast and brightness in the software is a must have feature.

A few Web cams have buttons that let users take snapshots. This is a handy feature if you use the camera for photo e-mail cards or to capture images of your family for a Web site.

Finally, most Web cams come bundled with different software. Depending on your needs, you may choose a camera with surveillance software or one with a Web page builder. Check the camera's box for software and instructions on each application. You can also find downloadable software on the Web (http://developers.webcamworld.com/slist.html).

We reviewed four Web cameras that met our criteria: 640 x 480 resolution, 24-bit color, a frame rate of 30fps, and a good selection of bundled software. After discussing installation, we'll walk you through the setup for the 3Com HomeConnect PC Digital Camera, the Logitech QuickCam Pro, the Kodak DV325 Digital Video Camera, and the Intel PC Camera Pro Pack.

■ Easy Installation With USB. When small PC connected cameras were first introduced, they attached through the Serial or Parallel ports. Today the vast majority of Web cams connect via USB. USB is a versatile connector with the ability to interface your PC with all sorts of computer peripherals, including keyboards, scanners, and Web cams. Introduced about five years ago, it has been more heavily used in the last two years since Win98 was released with USB support. USB is faster than standard parallel and serial connections and is ideal for devices such as Web cams.

USB has true Plug-and-Play capabilities, which means if you plug a USB device into a computer running Win98, the operating system detects the new hardware and automatically installs any drivers it needs to run the hardware. To use USB peripherals, you also need a USB port on your PC. Most desktop PCs manufactured in the last two or three years ship with USB ports. Check the back of your PC and look for rectangular ports and the official USB logo.

If you're not sure if your computer is USB capable, right-click My Computer, click Properties from the pop-up menu, and click the Device Manager tab. Double-click Universal Serial Bus Controller. If you see Universal/Open Host Controller, your PC supports USB. Alternately, you can download USBReady, a small application that checks for you, from (http://www.usb.org/data/usbready.exe).

The simple steps for installing a USB Web cam are:

1. Make sure your computer supports USB.
2. Run the installation software that comes with the camera.
3. Plug in the camera.

Following these steps was enough to successfully install all four of our test Web cams. Now we will look at individual setup in more detail.

Logitech QuickCam Pro

1. Put the QuickCam 5.1 CD in the CD-ROM drive. The menu screen appears. *(NOTE: If the CD doesn't run automatically, go to Start, select Run, and type in* **drive:setup.exe** *where "drive" is the letter of your CD-ROM drive.)*
2. Double-click Install QuickCam Software.
3. Choose the setup language from the seven listed and click OK.
4. Read the Licensing Agreement and click Yes to accept.
5. Choose Express or Custom Setup.
6. The program will copy and install the necessary files to your computer. It may ask if you also want to install Microsoft NetMeeting.
7. After the files are copied and installed, the software checks your USB port to make sure it's working properly. At the prompt, plug in your camera to one of the USB ports on your computer.
8. A New Hardware Found dialog box appears with the message Unknown Hardware Detected. The operating system will install the proper drivers for the camera.
9. Once the drivers are installed, you'll see a test image from the camera. If the image doesn't appear, the software lets you click Fix It in order to unplug other USB devices that could be causing a conflict. After unplugging all devices, including the camera, the software prompts you to plug the camera back into a USB port.
10. You should now have a shortcut icon on your Desktop, and the program should be in your Programs menu under Start.

The Logitech camera comes with a software bundle that includes Microsoft NetMeeting for videoconference calls and MGI PhotoSuite II for image editing and VideoWave II for video capture and editing.

3Com HomeConnect PC Digital Camera

1. Insert the 3Com HomeConnect Video Connection CD. You'll be prompted to click OK to run the 3Com HomeConnect Install Assistant.
2. A dialog box asks if you want to install all of the software. If you don't want all of it, select which programs you want and click Next.
3. Choose Typical or Custom Setup.
4. Read the Licensing Agreement and click Yes to accept the terms.
5. The program copies and installs the necessary files to your computer, which completes the software installation.
6. Plug in the camera to a USB port. The operating system will detect the camera and install any necessary drivers.

The 3Com camera comes with a software bundle that includes Microsoft NetMeeting, PictureWorks NetCard Pro for attaching video clips or still photos to an e-mail postcard, and PictureWorks Live for capturing still images or recording video clips, Digital Camera ViVIEWer for editing and viewing video or still shots, RealNetworks' RealPlayer G2 for viewing RealMedia video clips, and Webcam32 for live video feeds to the Web.

Logitech's QuickCamPro USB installs quickly and easily.

Kodak's DVC325 Digital Video Camera

1. Insert the Kodak Windows Software 1.0 CD into the CD-ROM drive.
2. Choose a setup language from the three listed and click OK. A menu screen appears.
3. Click DVC325 Software to load the camera's drivers.
4. A couple of dialog boxes pop up warning you that a USB must be enabled and to unplug the camera if it's already plugged in.
5. Click Next through the setup. Read the Licensing Agreement and click Yes.
6. The program copies and installs the necessary files to your computer.
7. At the prompt, plug in the camera. The operating system detects the camera and installs any necessary drivers. After the operating system is done installing, click OK.
8. You will need to install Presto! Video Works, Presto! Mr. Photo, and Microsoft NetMeeting individually if you want to use these programs.

The software bundle for the Kodak camera includes Microsoft NetMeeting, Presto! Video Works for video capture, and Presto! Mr. Photo for image editing.

Intel's PC Camera Pro Pack

1. Insert the Intel Create And Share Software Deluxe CD in the CD-ROM drive. The Welcome screen appears. Click Next.
2. Read the Licensing Agreement and click Yes to accept the terms.
3. Type in the product ID number from the back of the CD sleeve. Click Next.
4. Select the destination directory and click Next.
5. The program copies and installs all of the necessary files to your computer.
6. Once the files are installed, plug in the camera to a USB port. The operating system detects the camera and installs any necessary drivers.
7. The software puts an Intel Create & Share Software icon on your Desktop. Double-click the icon to launch the video software. The first time you open the program, the Configuration Wizard walks you through tests of you modem, microphone, sound card, and speakers to make sure the videophone application works.

Intel's software bundle includes Intel Video Phone Software, Intel Email Postcard for attaching images or video clips to e-mail, PC Camera Games, Intel Auto Snapshot and Intel Home Page Builder for creating Web pages with a live camera feed, Intel Movie Builder for editing video clips together with wipes and other special effects, Intel Scene Recorder for recording video clips, and Intel Gallery for organizing the clips you have on your hard drive.

If your Web cam doesn't come with Microsoft NetMeeting, you can download it free from Microsoft's Web site (http://www.microsoft.com/windows/netmeeting). See the article entitled, "Setting Up Videoconferencing Equipment" in this issue for more information on videoconferencing.

■ **Live Web Broadcasting.** Once everything is installed, you can start using the software to record video clips. Before showing your face off to the world, take the time to adjust the focus, usually a dial located on the camera's lens, and adjust the contrast and brightness, found in the software control settings. When you get the picture you want, you are ready to try a videoconference or Web cast.

The easiest and most popular method of publishing Web cam images live to the Web is through an FTP (File Transfer Protocol) upload, sometimes called a client pull. It involves using FTP to send periodic images from your camera to a Web server. The Web page containing the image can then be set to refresh, periodically updating itself with the new images for viewers to see.

FTP comprises a client and a server. The client is software that resides on your computer; it retrieves and sends files. The server is software that resides on a server machine, such as the ones your ISP (Internet service provider) uses, where the files are stored. Most ISPs that provide Web site hosting also allow FTP connections to their machines for transferring files.

Using special software, you can specify the interval when your Web cam will take a snapshot and then FTP the image to your Web site. If that image is called into a Web page, it will show the latest snapshot every time it is refreshed. Many Web cams refresh every 30 to 60 seconds.

To configure and use FTP, you need to know several things: the name of the FTP server, such as ftp.geocities.com, or the IP (Internet Protocol) address, such as 38.31.126.151; the user ID and password for the FTP server; and the directory where you want to save the files.

Of our four cameras, two have software that automatically updates at timed intervals that

Terms To Know

bandwidth—Amount of data capable of transferring over a network or Internet connection at one time.

client pull—A method of viewing live video shots on the Web where the browser requests the most recent image at set intervals, usually 30 or 60 seconds.

e-mail greeting cards—Embedding video clips or still photos into e-mail cards.

frame rate—The rate at which frames, or individual pictures, are updated in a video. Frame rate is usually measured in frames per second (fps). Motion in videos with high frame rates appears more fluid than videos with low frame rates. A rate of 30fps is usually required to trick the human eye into seeing full motion.

FTP (File Transfer Protocol)—An Internet-based communications protocol that lets you move files between two computers.

IP (Internet Protocol) address—A number assigned to a computer used in locating specific machines on the Internet. Displayed as a series of four numbers, such as 38.31.126.151.

live Web broadcast—Sending snapshots to the Web at regular intervals or streaming video from your Web cam.

resolution—The number of bits of information, called pixels, which reside within a given dimension. For example, a standard monitor resolution might be 1,024 x 768 or 800 x 600.

server push—Method of viewing live video where the Web server streams a series of images to a Web browser after only a single request is made.

USB (Universal Serial Bus)—A high speed, standardized connection between a peripheral and a PC. Drivers for most new hardware are built in to Windows 98 and Windows 2000, making it a true Plug-and-Play technology.

the user specifies. Logitech also includes free space for your Web site at Spotlife (http://www.spotlife.com). If your ISP does not give you free space for a Web site, try one of the free services, such as Yahoo! Geocities (http://www.geocities.com) or Lycos' Tripod (http://www.tripod.com).

Logitech's software generates a Web page and uploads the image and page together. You determine some simple settings, such as time between refreshes and the message on the Web page. Then the software's built-in FTP uploads everything. Viewers can reload the page by typing the number of seconds they want in the time delay on the Web page and pressing ENTER.

The 3Com HomeConnect camera comes with Webcam32, a shareware program that you can download (http://www.surveyorcorp.com/webcam32). When you download Webcam32, you have to register and pay a $25 registration fee after the trial period. With Webcam32, you will need to build your own Web page. Using a minimal number of graphics on the page will speed up download times. Place the image that Webcam32 continually updates in your Web page. Using the software's default file name, the HTML (Hypertext Markup Language) code looks like this:

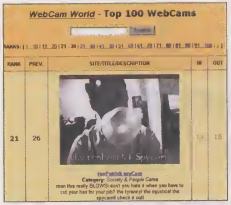
```
<img src="webcam32.jpg">
```

To force the page to reload and show the new image, use the following code inside the <head> tags:

```
<meta http-equiv="refresh" content="60">
<meta http-equiv="pragma" content="no-cache">
```

The first line of code reloads the page every 60 seconds. Change the number for longer or shorter times between reloads. The second line tells the browser to load the image from the server on every reload, not from the browser's cache, or temporary files used to speed loading times.

Another way to refresh your image is with a Java applet. Place the applet anywhere within the page and it will refresh the image without reloading the whole page. You can also download the JavaCam Applet from the Webcam32 site (http://www.surveyorcorp.com/webcam32help/java.htm).



Webcam World has a directory of the best Web cam sites and everything you want to know about Web cams.

Webcam32 is shareware that you can use to send video images to the Web.

■ **Streaming Video.** Streaming video, also known as server push, gives viewers a live video feed, but it is also takes a lot of resources and bandwidth to make it work correctly. Your Web cam software acts as the server allowing viewers to look directly at the images coming from your PC. In the HTML code, specify your machine's IP address. If you use a dial-in ISP, you probably get a different address assigned to your machine each time you dial in. This makes it difficult to place code in an HTML page since the address always changes.

We tested Webcam32 with a 56Kbps modem to see if we could achieve a video stream. After dialing in, Webcam32 displays your temporary IP address under Help, About Webcam32. You can use that address on Port 81 to view the video. The HTML code looks like this:

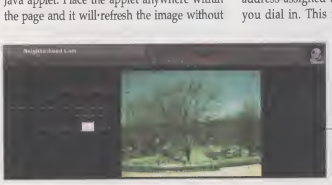
```
<img src="http://38.31.126.151:81">
```

While we remained logged in with that assigned IP address, we watched the full motion video, but between each frame was a blink of white space, making it choppy. Even though we were able to make it work with the 56Kbps connection, we recommend a higher bandwidth connection, such as DSL (Digital Subscriber Line), cable modem, ISDN (Integrated Services Digital Network), or a T1 connection for a sustained broadcast.

If you are trying to do this from a network behind a firewall, you may need to ask to have Port 81 enabled. You should also warn viewers that they need Internet Explorer 4.0 or Netscape Navigator 4.0 to see this video stream.

With a little time and effort, you can easily install a Web camera and broadcast a live video feed to the Web. LS

by Greg Schick



Logitech's software auto generates a Web page for your Web cam.

For More Information

3Com
HomeConnect PC Digital Camera
$149
(800) 638-3266
(408) 326-5000
http://www.3com.com

Eastman Kodak
DVC325 Digital Video Camera
$99
(800) 235-6325
(716) 726-7260
http://www.kodak.com

Intel
PC Camera Pro Pack
$129
(800) 538-3373
(408) 765-8080
http://www.intel.com

Logitech
QuickCam Pro USB
$149
(800) 231-7717
(510) 795-8500
http://www.logitech.com

Set Up Videoconference Equipment

Retain The Human Element In Remote Communication

Videoconferencing used to be an option only for large businesses because the hardware and professional installation costs required deep pockets. Now computer users who want to enjoy the benefits of videoconferencing have no excuse. There's a camera for every budget, most of the best videoconferencing software is free, and new standards and interfaces have made installation a breeze while guaranteeing compatibility. In fact, the only obstacle most people face is overcoming stage fright.

The main problem users face is the number of choices. There are dozens of cameras from multiple manufacturers that all claim to offer different things. You have to differentiate among the videoconferencing software packages because there are so many available. And, once you make up your mind and commit to a purchase, you have to install it so it works together. This article will take much of the guesswork out of purchasing, installing, configuring, and using videoconferencing hardware and software.

You don't need a lot of special hardware to add videoconferencing capabilities to your PC. You'll need a camera, of course, perhaps a video capture card, and a microphone. You'll also need a sound card with line-in or microphone inputs, speakers or headphones to play incoming audio, and a modem or LAN (local-area network) connection so you can actually communicate with other PCs. It's very likely the sound card and modem that came with your computer meet or exceed the requirements for videoconferencing; you'll want to make certain you have a 56Kbps (kilobits per second) modem. All you really need to worry about is the microphone and camera.

Microphones. We'll talk about the microphone first because it is the least complicated purchasing decision you will have to make. Stay away from handheld microphones. They are awkward to use, and you'll miss out on much of the functionality videoconferencing accommodates, such as typing while you talk, if you are holding a microphone all of the time.

Some people like microphones that clip to a lapel or headset microphones, but the cords can become problematic when you swivel around in your chair to grab something from your desk.

Directional microphones that sit on the desk have worked best for us because we position them to pick up only our voice and not sounds from, say, a nearby radio. You can also use them with any other application on your PC that allows for audio input. We also like cameras with built-in microphones because they are always active as long as the camera is working, but they don't always work with other non-videoconferencing software on your PC.

Cameras. There are many specifications to consider when buying a camera. Before we discuss the various cameras on the market, you'll need to know what all of the numbers and descriptions mean. We have outlined the most important specifications and described what you should look for and avoid when purchasing a camera, based on your needs and the type of computer you have.

Interfaces. When looking for a camera, one of the biggest decisions to make is in choosing

Key Points

- One of the best real-world applications for videoconferencing is telecommuting.
- More companies than ever let their employees work from home, but face-to-face meetings still are important.
- When employees working from home have videoconferencing equipment, they can collaborate with colleagues and meet with management, retaining the human contact that is lacking with e-mail and telephone calls.

an interface. As the choices have increased, it has become a matter of opting for image quality over ease of installation and vice versa.

In the past, cameras that relied on video capture cards were the norm, but that's changed. They're still available and very popular because of their superb performance. An interface with a video capture card works like this: The camera is attached via a cable to a video capture card that is installed in a PCI (Peripheral Component Interconnect) slot on the PC's motherboard. The video capture card does all of the video processing chores, freeing the computer's CPU (central processing unit) for other tasks and easing the strain on your video card.

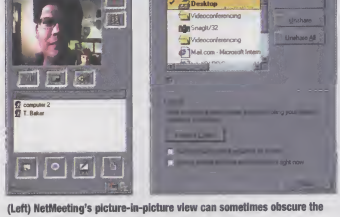
Because the video capture card is doing the work, cameras that use these cards benefit from what is known as hardware-accelerated video. The dedicated hardware allows for a higher number of fps (frames per second), greater resolutions, more vibrant color depths, and sharper video output. You can read about the importance of all these things later in the article.

The drawback to cameras with video capture cards is that they are far more complicated to install. You have to take the case off of the PC, find an empty PCI slot, install all of the necessary software drivers for the hardware, and possibly resolve system resource conflicts that can be a bit difficult to track down. If you have some experience installing things, such as internal modems and video cards, you shouldn't have any trouble, but less experienced users might want to opt for a camera that uses an external interface.

Until recently the only external interface that was commonly used with video cameras was the parallel port (and to a lesser extent, the serial port). Parallel port cameras are easy to install, but performance suffers because the parallel port is so slow relative to other interfaces. If you don't have any USB (Universal Serial Bus) ports on your computer, a parallel port camera might be a viable option, but we recommend that you either get a camera that uses a video capture card or buy a USB add-on card that adds a few USB ports to an older PC. Bear in mind that add-on cards only work with PCs running Windows 98 (Win98), so if you have Win95 you'll have to pass.

If you bought your PC in the last few years (during or after 1997), you likely have a pair of USB ports on the back. USB cameras are extremely popular right now because many approach the image quality of a PCI solution, yet offer ease-of-installation that PCI-based cameras can't touch. They perform better than parallel port cameras because the USB interface is faster than the parallel port interface.

The major drawback to USB cameras is that they have no video capture card and therefore rely on the computer itself for everything, including power. The computer's CPU, RAM (random-access memory), and video card are the three main components that will determine how a USB camera performs. Nearly every other PC component, from the hard drive to the operating system, also affects USB camera performance to a smaller degree. Users with older computers that have aging components may want to avoid USB cameras for this reason.



(Left) NetMeeting's picture-in-picture view can sometimes obscure the person you are talking to. It's better to use the separate video window. (Right) NetMeeting allows for file sharing and remote Desktop control.

If you decide to buy a USB camera make sure you have a CPU that runs at 200MHz (megahertz) or above, have at least 64MB (megabytes) of RAM (preferably 128MB), and have a video card with at least 4MB of video RAM. Video is one area where a beefy computer is essential for decent performance.

Resolution. A camera's resolution is the maximum image size it can capture, measured in pixels wide by pixels high. A resolution of 640 x 480, for example, means the camera is capturing images that are 640 pixels wide by 480 pixels high. Larger images allow for more detail but also require much more video processing horsepower to push all those extra pixels each second.

Many people purchase the video camera with the highest resolution they can find, thinking it will be the best. This isn't always true. Resolutions higher than 320 x 220 are usually good for still shots, especially where USB cameras are concerned. Also pay attention to a specification that reads something like "Maximum resolution: 1,024 x 768 with software interpolation." Any time software is used to increase the resolution of the video images, information is being added to the picture that wasn't there in the first place. In other words, the size of the image increases, but the amount of true detail remains the same, leading to bloated and blurry images. Make sure the maximum resolution cited on the camera box refers to its hardware-supported resolution.

Color depth. Another oft-quoted specification is a camera's color depth, expressed in such terms as 16-bit or 24-bit. All you need to know is that a camera running with 16-bit color is capturing a maximum of 64,000 colors per frame, while a camera with 24-bit color capabilities can capture up to 16.7 million distinct colors per frame. Because the resolution of consumer-level video camera's is so low, extra colors can make an image look much more detailed. Finding a camera with 24-bit or higher color is essential if you want to use it for still shots of any quality.

Frames per second. The fps (frames per second) specification is self-explanatory: It is a measure of the number of pictures a camera takes per second. In the consumer-camera world, 30fps equates to smooth movement, while lower numbers will lead to jerky, blurred video. Bear in mind that the number listed is the maximum speed the camera supports but doesn't necessarily mean it supports that speed at all resolutions and color combinations. Frequently, the 30fps applies only to small resolutions in 24-bit color or medium resolutions in 16-bit color when used to describe a USB device. Cameras with hardware video capture cards can usually maintain 30fps across their entire resolution and color depth ranges because the capture card provides a great deal of video processing muscle.

Something else to remember when discussing frames per second is that you may see smooth video on your computer, but it will never be that smooth when you send it to someone else over a modem connection. Sometimes you'll only be able to transmit and receive 2 to 3fps over a 56Kbps connection, so don't get

your hopes up. LANs are the only environments where video transmissions will even approach the smoothness associated with 30fps.

Sensors. Some companies make a big deal out of the sensor hardware their cameras use, but in our experience, this specification doesn't have any predictable impact on a camera's overall performance and image quality. Newer cameras use a CCD (charged-coupled device) that theoretically should be better than the CMOS (Complementary Metal-Oxide Silicon) sensors used in older cameras. Sensor quality varies from manufacturer to manufacturer so much that some CMOS-equipped cameras actually produce better images than their CCD counterparts, so try to see the differences for yourself before buying a camera.

Chat - chatting with 2 othe...
Baker:
Hey everyone!
computer 2:
How's it going?
Baker:
[movie to computer 2] Just checking out this chat program. It lets me send message only to you, too!
computer 2

NetMeeting also has a full-featured chat program.

Controls. Very few consumer-level cameras have knobs, dials, or any other visible way to adjust the hardware itself, but don't let that fool you. Many devices rely on software to adjust features, such as zoom, focus, and brightness. If you have the opportunity to test a camera before buying it, take time to play with the software so you can see what sort of settings are available and how easy they are to modify. Beware of cameras with a lot of checkboxes that enable automatic settings: manual adjustments are nearly always superior because they give you more control over the image.

Compatibility. It wasn't long ago that videoconferencing hardware wasn't compatible across brands, forcing users to buy equipment from the same manufacturer to get everything to work. Some older cameras still suffer from this incompatibility problem, but new videoconferencing standards practically guarantee that the camera you buy will work with any modern software package, and that it can communicate with cameras from other manufacturers. Look for products that support the H.323 and H.324 standards. If you want to use your camera as an input device for other software products, to take snapshots for Photoshop, for instance, make certain it supports the TWAIN (Technology Without An Interesting Name) protocol.

■ Product Overview.

Now that you know what the specs mean, you can compare cameras to some extent. We've gathered the specifications for many of the most popular models so you can get some idea of what to expect when you go to buy a camera. All prices are MSRP (Manufactures Suggested Retail Price) unless otherwise noted, but be aware that ESP (Estimated Street Prices) usually are much lower and many manufacturers offer rebates (especially when you buy two cameras).

HomeConnect PC Digital WebCam

The HomeConnect camera uses a USB interface, yet 3Com claims it can capture video at up to 60fps at a resolution of 160 x 120. The camera supports 24-bit color and uses a CCD sensor. Maximum hardware resolution is 640 x 480 for taking clear snapshots, and the device has H.323, H.324, and TWAIN support.

3COM
HomeConnect PC Digital WebCam
$173
(800) 638-3266; (408) 326-5000
http://www.3com.com

VideoBlaster WebCam 3 & WebCam Go

Creative's VideoBlaster WebCam 3 is a traditional camera with a hardware-supported resolution of 640 x 480 in 24-bit color at up to 15fps. The company claims it is possible to capture 30fps in 24-bit color when the resolution is dropped to 352 x 288. The camera uses a CMOS sensor and either a USB or parallel port interface.

The WebCam Go has similar specifications but can be detached from its cable and loaded with batteries to act as a standalone digital camera for taking still shots. Pictures are stored in the unit's 4MB of internal memory.

Creative Technology
VideoBlaster WebCam 3
$71
WebCam Go
$136
(800) 998-5227; (405) 742-6600
http://www.creaf.com

PC Camera Pack & PC Camera Pro Pack

Both of the cameras from Intel use a USB interface and have CCD sensors capable of capturing images at 640 x 480 in 24-bit color. At lower resolutions, video capture at up to 30fps is possible. The more expensive Pro Pack comes with more software than the $79 model.

Intel
PC Camera Pack
$79
PC Camera Pro Pack
$99
(800) 538-3373; (408) 765-8080
http://www.intel.com

QuickCam VC & QuickCam Pro

Logitech's QuickCam line is perhaps the most popular series of PC video cameras. The entry-level QuickCam VC connects to either a parallel port or USB interface and has a maximum resolution of 352 x 288 in 24-bit color at up to 30fps. The bigger, better, and more expensive QuickCam Pro ups the maximum resolution to 640 x 480, comes with a microphone, and has a bigger software bundle.

Logitech
QuickCam VC
$50
QuickCam Pro
$150
(800) 231-7717
(510) 795-8500
http://www.logitech.com

C-it XVP 510 IBM PC Camera, IBM PC Camera Pro & IBM PC Camera Pro Max

Xirlink manufacturers cameras for IBM, and the IBM PC Camera is just a Xirlink C-it XVP 510 with an IBM label on it. Both cameras have a maximum resolution of 352 x 288 in 24-bit color at up to 30fps and use USB interfaces. There are two high-end cameras manufactured for the PC Camera Pro series. The basic PC Camera Pro has a CCD sensor with a hardware-supported resolution of 640 x 480 in 24-bit color and can run at up to 30fps in 24-bit color when the resolution is set at 352 x 288. The Pro Max version shares the same basic specifications but has a video input port to which users can connect external video devices, such as camcorders. Inputted video can then be edited with the software included with the Pro Max.

Xirlink
C-it XVP 510 IBM PC Camera
$50

IBM PC Camera Pro
$80
IBM PC Camera Pro Max
$130
(800) 254-1422; (800) 928-8008
http://www.xirlink.com

■ Videoconferencing Software.

As you know, even the best videoconferencing hardware will do you no good without some software. We tested two of the most popular packages you'll want to choose from when setting up your system.

There are two main categories of videoconferencing software: one-on-one and group packages. The former lets you share video with one person at a time while a group package lets you view multiple video windows. Group packages sound better in theory, but in practice, keeping track of several people at once can hinder communication more than it helps. Many people use the group packages to communicate with only one person at a time for this reason.

NetMeeting

Microsoft's NetMeeting is one of the most popular videoconferencing applications for several reasons. Highest on the list is the fact that it's free, but it also happens to be one of the most robust one-on-one videoconferencing solutions we've tested. Video performance is outstanding, and we like the collaborative features, such as the whiteboard, that everyone can use simultaneously. Even if the person at the other end of the connection doesn't have a video camera, he or she still can receive video from you and use the audio conferencing features.

The software lacks the ability to videoconference with more than one person at a time, although several people can participate in text chats or collaborate using NetMeeting's other features.

Microsoft
NetMeeting
Free
(800) 426-9400; (425) 882-8080
http://www.microsoft.com

CU-SeeMe 1.0

You likely have seen the popular CU-SeeMe videoconferencing product on store shelves, but why not use the freeware version given to the world as a gift by Cornell University? It supports all of the basic features users will need to establish a videoconferencing session and trumps NetMeeting in at least one area by letting users set up group videoconferences. You don't even have to install this efficient software; you just launch the small executable file, configure it to your liking, and you're set.

Cornell University
CU-SeeMe 1.0
Free
http://www.cu-seeme.net

■ Setting It Up: A Walkthrough.

So you've purchased all the cameras and downloaded all of the software you need to install a videoconferencing system, but how do you go about it? The installation process used to be complex to the point where it scared many PC users away from videoconferencing entirely. Now, with most cameras, you don't even have to open the computer's case to get the system up and running. We set up videoconferencing between two PCs on our LAN and took notes on the process so we could give you some idea of what to expect when you are performing a similar installation.

We purposely used different hardware on each PC so we could determine how difficult it would be for the average user to videoconference with any kind of PC as long as each had some kind of camera installed. Videoconferencing kits (especially those that include software) are so simple to install and configure that you won't need any help beyond the instruction manual. Fortunately, we discovered that putting together a videoconferencing system piecemeal is incredibly simple.

We installed an Intel PC Camera Pack on our first PC. As mentioned in the hardware section, this is a USB device, and it is very easy to install. We first installed the camera's software, which took about five minutes, and then connected the camera to a USB port. We were in business after a single reboot.

Next, we installed an inexpensive IBM PC Camera on our other PC. We used the same process we used for the Intel camera because the IBM device has a USB interface. If we had installed a camera with a video capture card, we would have had to shut down the PC, remove the case, seat the capture card in a PCI slot, and reboot. Most capture cards are Plug-and-Play compatible, so Windows automatically detects

Where To Connect

Unless you are videoconferencing with people over a corporate network or simply using your videoconferencing system to connect directly with people you know over the Internet, finding people to videoconference with can be an enormous pain for beginners. Fortunately, there are several sites and directories that can serve as a pre-established meeting place or just a spot to find new people to videoconference with.

There is one very important thing to be aware of before venturing onto the Internet in search of directories, and that is the adult-oriented theme of many directories. The vast majority of these directories are clearly labeled as adult and can thereby be avoided easily, but we recommend you do not let your kids get anywhere near your videoconferencing equipment unless you are there to see who they are chatting with. Even the general-purpose directories are rife with users intent on harassing people, so be careful.

That said, most videoconferencing software and hardware have corresponding directories of users that you can use to easily meet with a friend. NetMeeting uses the Microsoft Internet Directory, accessible by clicking the Find Someone In A Directory button.

CU-SeeMe uses directories known as reflectors, which are usually theme oriented. For example, you could use one of the computers at work to establish a workgroup reflector that only you and colleagues could access. For general and theoretically kid-safe reflectors, we recommend you go to the Chatpal.com site (http://www.chatpal.com) and use its free reflector scanner. Using a drop-down menu, you can choose a reflector category and look for active reflectors. Be aware that there is an adult reflector category because the aim of this site is to be a comprehensive list of reflectors.

Check the documentation for your videoconferencing hardware to see if the manufacturer offers any directories. Intel, for example, provides a database for its camera users so they have a place to meet. ❑

them when the system boots and prompts users for the appropriate drivers. Once the capture card is installed, you simply connect the camera to it and make adjustments as you would with any other type of camera.

■ Working With NetMeeting. After setting up the hardware on our machines, it was time to install the videoconferencing software. We chose Microsoft's NetMeeting since it's free, popular, and packed with useful videoconferencing features.

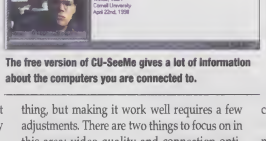
The first step was downloading the latest version of the software (version 3.01 in our case), which we found at http://www.microsoft.com/netmeeting. Despite all of its features, NetMeeting is a small file to download, about 1.5MB, and it should take less than 10 minutes, even with the slowest modem connection. Once downloaded, it was as simple to install as double-clicking the icon for the file and progressing through the automated installation process.

After installing the program, we configured it. Launch it by clicking Start, Programs, and NetMeeting. The first time you run the software, it will run through a Configuration Wizard. The first name and last name you enter will be the ID people will use to "call" your computer. On the screen that follows, you can check a box to withhold your ID from the Microsoft Internet Directory, which is a central database that shows all NetMeeting users who are currently connected to the Internet and accepting calls.

The next screen lets you choose your connection speed. Use one of the modem selections if you are dialing up to an ISP (Internet service provider) and the Local Area Network button if you plan to use NetMeeting to collaborate with colleagues over the office network. Use the drop-down list on the next screen to select the camera you just installed as a capture device and follow the rest of the prompts to get NetMeeting running properly. Once NetMeeting is running, you can adjust all of the settings you just established (and many more) by clicking Tools and selecting Options from the list. Tab through all of the available pages to see what settings you can change and don't forget to click the Advanced buttons. If you see a setting that doesn't make sense, right-click the text description and click What's This for an explanation.

When NetMeeting is installed on all of the computers you want to videoconference with, "call" someone. Type his or her ID (usually the first and last name) in the black bar at the top of the NetMeeting window and press ENTER. You can also click the phone-shaped Place Call icon and enter the information there, or you can click the Find Someone In A Directory button to search for someone online (or on your network). When the person at the other computer answers, you've established a connection and can share audio and video information. You then can use the icons at the bottom of the NetMeeting window to initialize the built-in Text Chat program, Whiteboard, File Sharing program, and File Transfer software. Look at the Help documentation for more information.

■ Fine-Tuning Video. Getting your videoconferencing equipment to work is one thing, but making it work well requires a few adjustments. There are two things to focus on in this area: video quality and connection optimization. We'll show you how to improve both.



The free version of CU-SeeMe gives a lot of information about the computers you are connected to.

Adjusting your camera's video quality will have varying results depending on its internal components, software, and the overall power of your computer. The first thing to do is consult the documentation that came with your camera to see if there are any special software features that can improve video quality but are not enabled by default. To make images look better, select the highest color depth setting (24-bit if possible) and, if there's a sharpness control, put it at the highest possible setting. Increase the resolution to the highest size that still looks smooth on your monitor to increase image detail.

Aside from video quality, you can do a few things to make your video captures smoother. Many times you'll find that the camera's specifications are a collection of half-truths. The most common example is a camera with the advertised ability to capture video at 30fps in 24-bit color at a resolution of 320 x 240 (or higher). Frequently the camera is capable of these things, but not all at once. For example, you may be able to capture video at 30fps in 24-bit color at a resolution of 160 x 120 but achieve only 5fps at a resolution of 320 x 240 in 24-bit color. This problem is especially common with USB cameras because they rely on the computer for video processing. The faster your PC, the better the results. Users with PCI video capture cards are used to achieving full 30fps video at high resolutions and color depths. To smooth the video, adjust the resolution, color depth, and settings, such as sharpness, until you arrive at a combination of settings that generates at least 10fps.

■ Adjusting Audio. Focusing only on the video quality of your videoconferencing setup is a mistake. You also have to pay close attention to audio settings, especially the input level of your microphone. Sometimes you can access audio settings directly from the videoconferencing software you are using, but usually it is best to make the major adjustments with Windows and fine-tune the microphone in your videoconferencing application.

Double-click the yellow Speaker icon in the System Tray to open the Volume Control window. If the icon isn't there, click Start, expand Settings, click Control Panel, and double-click Multimedia. Check the Show Volume Control On The Taskbar box and click Apply to make the icon appear.

Click Options and select Properties from the menu. Choose the Recording radio button and make sure the Microphone (or Line-In, if your microphone is attached to that port) box is checked before clicking OK. Now adjust the Microphone or Line-In sliders to the level you want (higher for louder input, lower for softer input). When you are finished, select Properties from the Options menu again and this time choose the Other radio button. Choose Voice Commands from the drop-down menu, click OK, and perform the same adjustments to the Microphone or Line-In sliders that you did in the previous step. You may need to repeat these steps as you use your microphone to get things just right.

NetMeeting has an Audio Tuning Wizard that is useful for establishing input levels. You can access it by launching NetMeeting, clicking Tools, and selecting the Audio Tuning Wizard. Follow the prompts, using the sliders that appear, to adjust recording and playback levels. LS

by Tracy Baker

Use Voice Recognition Software

Free Your Hands From The Keyboard

The same skills people learn almost automatically at a young age can be the most difficult for computers to pick up. Although babies all over the world pick up language abilities at an astonishing rate, computers muddle along with their superduper electronic brains, incapable of understanding even rudimentary speech. Even your lowly mutt who sleeps on a pile of old blankets in the garage can make more sense of your voice.

Even if your computer doesn't *understand* what you say, the newest software can at least *recognize* it. Today's voice recognition software comes closer than ever to the goal of making keyboards optional. We aren't there yet, but for a variety of users, voice recognition software is actually well worth the money. Below, we take a look at how voice recognition works and how it can work for you.

■ **How It Works.** The first step in voice recognition is converting a speaker's voice into something a computer has a chance of recognizing. That means translating your voice into something digital, which means numbers and more numbers.

Sampling. When we speak, the sounds we make vibrate and travel through the air in the form of an analog wave. An analog wave is like a ramp that has an infinite set of values. As the amplitude of the wave rises and falls, the pitch and tone of the sound correspondingly go up or down. This is the most realistic form of sound because every infliction is measured and represented on one of the infinite number of points on the wave.

However, today's computers don't deal with analog input, they deal with digital information. For a computer to interpret and output sound, it must turn analog waves into digital data through a process called **sampling**. Instead of recording the entire analog wave of sound, and analog-to-digital converter in your computer's sound card takes "snapshots" of the wave at various points in time. These points are then given a value, which is then translated into the digital language of **binary code** (a string of ones and zeros) that the computer can understand. When the sound is digitized, the result is more like a set of stairs than a ramp. Unlike an analog wave, a value can only be on one of the steps, not anywhere in between.

As a person speaks into a microphone, the electrical signal generated is divided up into

Key Points

- Voice recognition software uses a three-step process of digital sampling, recognizing phonemes, and statistical analysis to enter what you say on-screen. Although the software still isn't perfect, it has steadily improved in the past few years.
- You can use voice recognition software for more than simple dictation. Other uses include controlling your computer interface, security, and even browsing the Web.
- One of the first steps to using any voice recognition package is training it to understand your voice. Follow your program's instructions carefully so you get the best results.
- The more you use your software, the better it will become at recognizing your voice. If the software makes mistakes early on, be sure you correct it.

tiny slices of time. Each of these slices is assigned a number based on the characteristics of the signal at that instant. This long string of numbers represents a digital version of the speaker's analog sentence.

Before the voice recognition software even begins thinking about what these numbers represent, it's helpful to narrow the jumble down to the human component only. The computer carefully listens for pauses in the speech so it can sample background noises and then remove those noises from the entire data set. Voice recognition programs can also compare the numbers to known characteristics of human speech to remove occasional extraneous noises, such as automobiles and ringing phones.

Phonemes. Once the sounds are in a filtered digital format, the real work begins. At first, the problem may not seem all that difficult. Speak a particular word, and a particular string of numbers should result. If the computer runs the process in reverse, it should be able to recognize words from those incoming numbers. In practice, however, the task is a bit more challenging. Because no two people sound exactly alike, and because the same person can sound different depending on mood, excitement, fatigue, and other variables, sampling and simplistic raw matching is not enough. Voice recognition programs have to gamble a bit if they're going to be useful.

Researchers divide all the sounds that go into making up the words of a language into units called **ph**onemes. These building blocks, such as the "p" and "in" sounds that together make up "pin," are what voice recognition software attempts to find within the string of incoming numbers. Chances are the computer will recognize many of the phonemes it sees but not others. So, the software starts making educated guesses based on years of research into which phonemes typically follow others.

These hunches about ambiguous sounds also are solidified based on what the software already knows about how you speak. In the early days of speech recognition, "training" time required speakers to read paragraph after paragraph of prechosen sentences into their microphones. Because the software knew ahead of time what the person was going to say, it could learn how an individual said the various phonemes. Today's more advanced programs skip these lengthy sessions. Often, they only need the speaker to say a few quick sentences up-front; the software learns the rest along the way as the speaker dictates sentences. As the software's database improves, it needs to make fewer and fewer corrections.

Statistical analysis. Once the software has a handle on which phonemes it just heard, it begins combining them into words. Again, statistical analysis is used to fill in the gaps. For example, sounds alone will never tell the software whether someone said "to," "two," or "too." The problem grows larger when you figure that many words, technically speaking, aren't supposed to sound the same but are pronounced similarly by people speaking quickly or in particular dialects.

Careful research into spoken and written language usually provides an answer for the computer. For instance, say the software is pretty sure it heard "I like" and then something with the "oo" phoneme. Based simply on the sound alone it could be "you," "two," "moo," or many other choices. But the software also knows not all of these words are likely to follow "I like." By combining the sound and word probability scores, the software can make a good guess that "I like you" is the correct sentence.

■ Applying Technology.

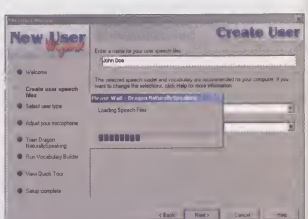
Developers putting all of this voice recognition research to use generally explore one of three market-hungry applications: dictation, interface control, and security.

Dictation software, which allows users to speak into a computer microphone and watch their words pop up on the screen, is the most popular. Dictation programs have been steadily improving during the past decade, moving from a discrete speech model to today's more accurate natural language products. Discrete speech recognition technology requires pauses between each spoken word to provide distinct phonemes and to let the computer catch up. Although this was better than typing for some people, the artificial stiltedness of the monologue kept such software from being swept into the mainstream.

Natural language technology, on the other hand, recognizes words at a more normal, conversational pace. Although a pause may still be necessary to add in punctuation and formatting, users of the latest software can speak in something approaching a regular pattern.

Several developers are vying for the growing natural language dictation market. Dragon Systems' NaturallySpeaking (http://www.dragonsystems.com) is probably the best known. IBM pioneered much of the research in this area and competes directly with Dragon through its ViaVoice software line (http://www.software.ibm.com/speech). Lernout & Hauspie recently teamed up with Microsoft to develop Voice Xpress (http://www.lhs.com/voicexpress), which comes in several versions and lets users navigate and dictate through Microsoft Office applications. In addition, European giant Philips Language Processing offers FreeSpeech 2000 (http://www.speech.philips.com/freespeech2000) for a variety of languages. The standard versions of leading packages usually cost about $100. Specialty users can spend more for add-ons and standalone solutions that are aimed at particular fields, such as law and medicine.

Many of the leading developers also build in compatibility tools that let mobile users take advantage of this technology. For example, Dragon offers NaturallySpeaking Mobile, a $229 digital recorder that you talk into and later plug into your PC, where NaturallySpeaking Preferred translates your voice.



The Dragon NaturallySpeaking New User Wizard guides you through the process of setting up your own profile.

Dictation technology also provides new and efficient ways for students to learn. Auralog's TeLL me More series (http://www.auralog.com) offers comprehensive language study that uses speech recognition

as a sort of private tutor. The ministries of education in Spain and France endorse the software, and AT&T and Ford use it to train employees. In addition, an IBM-implemented program in Philadelphia uses speech recognition to help teach kids how to read. Students use an on-screen cartoon tutor to help identify pronunciation mistakes. As a result, teachers can use the program to tailor lessons to each student's individual needs.

At Your Command.

Besides being a fast typing tool or an educational resource, speech recognition also carries the potential to eliminate the mouse. Interface software turns voice commands into the clicks, drags, and codes that make programs run. Today's software often includes the capability to open and close windows, click buttons, or run Web browsers. (See the "Browse The Web With Your Voice" sidebar.)

Command recognition is also branching out to noncomputer uses. Perhaps you've used a telephone voice mail or switching system that lets you say numbers rather than punch them in by hand. Many new wireless phones let drivers dial numbers by voice so they can keep their hands on the steering wheel. Microsoft promotes a similar idea called Auto PC, which is a voice interface device for your car that works as a CD player and information manager to give you directions, read e-mail aloud, and skip to selected songs on your compact discs.

Training requires new users to read a few minutes' worth of text so the software can begin adjusting its vocabulary to your speech patterns.

Combination dictation and interface capabilities, and you're well on your way to a computer that needs neither the keyboard nor the mouse. Today's versions are still a little clunky, but the components are workable and improving with each version. No one doubts that speech recognition will grow to become one of the most important ways in which people interface with computers. The technology promises a convenient way to control home appliances, quickly accomplish routine tasks, or even navigate from point A to point B in your car by asking questions and getting constantly updated directions spoken back to you.

Stop Right There.

Security is another up-and-coming role for speech recognition, but it's one you may not think of right away. Biometric technology punts hard-to-remember passwords in favor of voice identification and verification. Companies are beginning to test systems that guard access to ATMs, computers, voice mail, and wireless phones. Veritel's Voice*crypt* software (http://www.veritelcorp.com) brings the idea to consumer machines. Users can use the program to lock others out of selected files or their entire computer.

Voice recognition also can be used to secure people. VoiceTrack (http://www.voicetrack.com) is a program designed to track parolees, probationers, pretrial defendants, offenders who haven't been sentenced yet, juveniles, and individuals on work release. The voice verification feature allows corrections officers to determine whether someone is where he or she is supposed to be at any given time. With a single phone call, the system matches the subject's voiceprint and verifies the person's identity.

That's not the end of the story for this diverse technology. New companies and new

Browse The Web With Your Voice

Although dictation abilities get most of the press, voice recognition software is good for other jobs, too. One of the most interesting that we discovered using Dragon NaturallySpeaking is the ability to surf the Web without touching the keyboard.

Getting into gear doesn't take long with NaturallySpeaking or similar programs, such as Conversa Web and IBM's ViaVoice. The common commands of your Web browser are fairly easy to master. For instance, in NaturallySpeaking, the "go back" command tells the system to load the previous page. "Go forward" moves you ahead one page, and "go home" tells the browser to display your start page. You can even tell the browser to go to sites stored in your Favorites file.

The most impressive capability, however, is the way the software lets you click from page to page simply by speaking up. In NaturallySpeaking, users say the first few words of the links they want to follow. For example, if you happen to be viewing a page of links to news stories, you can just start to read one of the headlines. A red arrow appears on-screen to indicate the link you have chosen, and the new page loads automatically. ViaVoice displays small numbers next to various links, and speaking the number aloud is equivalent to a mouse-click.

Although the feature isn't quite as intuitive, these software packages also let you fill in Web page forms so you can perform searches, buy things online, or enter text on your favorite chat pages.

Would you want to surf by voice all the time? Probably not. Rabid Web users will find a voice-activated system responds more slowly than simple furious mouse-clicking. But it's nice to lean back once in awhile, put your feet on the desk, and speak your way through the Web. ■

uses for speech recognition products are popping up all the time. Check out the Web site at http://www.tiac.net/users/rwilcox/speech.html#NEW for a comprehensive list of speech recognition industry links. For example, Vocal Systems (http://www.vocalsystems.com) is set to begin marketing a program called OmniBabel, which not only recognizes speech but also translates it into another language and then speaks it in that language. It won't be long before language-translation services are cheap enough to facilitate telephone and videophone conversations between business users and friends in different countries.

■ **Speaking Of Today.** The only way to make sure the buzz over speech recognition isn't all talk is to try it for yourself. We'll take a closer look at installing, training, and using the market leader, Dragon's NaturallySpeaking 4.0. Investing the time and money Dragon requires still isn't for everyone, but you may be surprised how well dictation and interface software works today.

To begin, load the CD in your CD-ROM drive and click the Install button. After the setup process completes, open the Dragon NaturallySpeaking program in your Start menu or click the newly minted menu button in Microsoft Word 97/2000 or Corel WordPerfect 8/9. If this is the first time you've run the program, a user dialog box should be the first dialog box you see. Click New to begin the process of setting up your own profile.

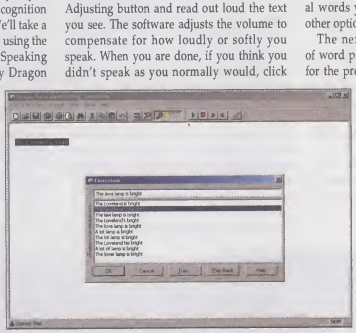
The New User Wizard appears to guide you through the process of setting up the program to recognize your voice and adjust the hardware and software to run best in your environment. Click the Next button to begin. In the next box, enter your name. The default choices in the other drop-down menus are best for new users. Click Next again to proceed.

After a few moments of loading files, the wizard asks how you will be using the program. Most users should select the first choice, speaking Directly To The Computer. However, if you will be dictating into a portable recorder for later translation into text, pick the second option. Click Next again.

Next, the program wants to know how you will be speaking to the machine. The USB (Universal Serial Bus) version of NaturallySpeaking comes with a special USB microphone for more accurate recording. For other versions, you will probably want to select the name of your sound card where you plug in a standard microphone or headset. Click OK to continue.

Now the wizard tests your microphone levels. Click the Next button to move past the explanation dialog box. Pick the radio button next to the type of microphone you will be using. In most cases, headset is the best option.

On the following screen, you'll see a picture with a brief description of where you should place the microphone. When you're all set, move to the next screen. Click the Start Adjusting button and read out loud the text you see. The software adjusts the volume to compensate for how loudly or softly you speak. When you are done, if you think you didn't speak as you normally would, click Start Adjusting to start over. When you're finished, go to the next screen.



NaturallySpeaking's correction screen pops up whenever you tell the software it has made a mistake. You choose the correct option, and the program then "learns" how you speak.

Click the Start Quality Check button so the software can test how well your microphone and sound card work together. Then click Finish.

■ **Teach It A Lesson.** Now it's time for General Training, so click the Continue button to get started. The software presents a couple of test sentences; click the Record button and read them aloud. After that, choose from the list of longer selections and read them aloud as you did the other sentences. If you make a mistake or the computer doesn't understand what you said, a yellow arrow will appear to tell you where to start over. The process takes about five minutes. When you're finished with the training, click OK.

NaturallySpeaking then calibrates its calculations to match your voice. When it is done, the wizard box reappears with a button titled Run Vocabulary Builder. It's not necessary to do this right away, but it helps the software's accuracy.

Inside the Vocabulary Builder, the first screen begins by outlining the process. Click Next to get going. The following screen lets you browse the files on your hard drive or network for a customized word list. Unless you've worked with a similar program in the past, you probably don't have a list of unusual words you regularly use. Click Next for other options.

The next screen lets you add any sort of word processor file stored on your drives for the program to analyze. It's a good idea to select documents that represent the kinds of things you frequently write about and any document with specialized vocabulary you're likely to use again. Click Add to fetch a few and then click the Analyze Documents button. The software runs through the files and looks for any words it does not know. When it's through, click Next.

Now look through the list of words that appears and check those you want the software to know. Click Add Checked Words To Vocabulary and follow the instructions to make the word part of the program's database. Click Next, and then Next again, then Finish so the software can analyze the dictation style from your documents.

Back in the wizard, the program asks you to take the Quick Tour to learn basic dictation techniques. Unless you're pressed for time or already know the drill, this is a useful introduction to how voice recognition software works.

Finally, click Finish to try it yourself. Open your word processor, put on the headset, and look for the microphone icon in the Windows Taskbar System Tray. If it is lying down, click it with the mouse to make it start listening. When the microphone is pointing up at a 45-degree angle, you can begin speaking your first sentences.

■ **Let Your Voice Be Heard.** Don't expect too much out of the system the first time you speak into your microphone. Unfortunately, the days of computers carrying on conversations with their owners are not quite here yet. Your first day with a voice recognition package won't be the last day you touch a keyboard. In fact, you may find that the first few times you use the software, it doesn't seem to recognize your words very well at all.

Just don't give up right away. As with anything else, it takes some practice to figure out how to best use a speech recognition package. We found it helps if you speak clearly and enunciate your words. There is no need to overcompensate, but we had the best results when we spoke just a bit more slowly than if we were speaking with a real person. Of course, that probably depends on how fast you normally speak. In either case, accuracy should improve as the software begins to understand your particular speech patterns.

When the program makes a mistake in translating your voice, it is very important that you be sure to correct it. With NaturallySpeaking, you usually can just say, "correct that" when you notice a bad translation. In the box that appears, select or type the correct phrase. Each correction you make helps improve the program's accuracy. For instance, we initially had trouble with similar-sounding words, such as Jack, chat, and cat. A few corrections brought a great deal of improvement although the program still fell a bit short of perfection.

It's also a good idea to learn the basic formatting commands that make word processors such useful editing tools. Take a trip through the instructions that came with your speech recognition software so you know how to do things such as move the cursor around the screen, select and deselect text, and operate the program's common commands. For example, NaturallySpeaking lets you say the word "click" followed by the name of almost any menu or on-screen button.

Once you have the basics down for controlling work within a program, take a trip into the broader realm of Windows. NaturallySpeaking lets you use your voice to do most of the things a mouse can do, such as open programs, click menu options, and switch between windows. The program also functions with just about any text-related program you might use, so it's possible to dictate and send e-mail, put numbers in spreadsheet cells, and enter information into databases.

We did find a few limitations as we dictated this article and gave speech recognition a tour through some other office work. Dictation can be enjoyable, but fast-paced editing seems a little clunky when you're relying on voice commands rather than the mouse. Although hands-free manipulation of words, sentences, and paragraphs is possible, it remains more time-consuming than we'd like.

Of course, technology that requires sustained speaking also is not conducive to environments such as the classroom, the library, a busy open office, or meetings. And just like your mother always used to tell you, we don't recommend eating and speaking into the microphone at the same time.

■ **The Bottom Line.** Most of the time, however, when you're sitting alone in your cubicle or in your private office, speech recognition gives you a great alternative for completing many jobs. There are a number of reasons to climb over that learning curve. Some people may think more clearly while speaking rather than typing. Slow, and even fast, typists may find they can dictate faster than they can move their fingers. Painful conditions, such as carpal tunnel syndrome, also can be a big incentive to make voice recognition work. It's also nice just to be able to get up and walk around rather than being strapped down to your desk for eight hours a day. Unless your walking and talking bothers your co-workers, the only limit is the length of your microphone cord, so stretch your legs.

No, speech recognition still isn't 100% accurate; on the other hand, typing isn't 100% accurate, either. Until someone invents a computer that can simply read our thoughts, there will always be errors in the translation between the human brain and the screen. You might as well let your fingers off the hook and give them a break on occasion. LS

by Alan Phelps

Terms To Know

biometrics—Technology used to either identify or verify the identity of someone using one or more physical characteristics, such as the sound of their voice. Biometric systems can be an easy-to-use, secure substitute for passwords or keys.

discrete speech recognition—Older technology that requires users to pause between words to allow time for the software to keep up with what the user is saying.

natural language—The growing ability of voice recognition programs to translate sounds into screen text nearly as fast as people naturally speak.

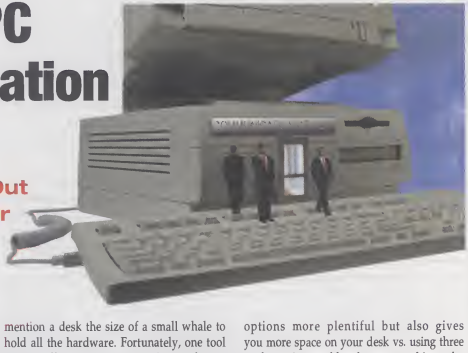
phonemes—The basic building blocks of language, phonemes are the sounds that people string together to form words and sentences. Voice recognition software begins its work by breaking down incoming data into phonemes and using statistical analysis to fill in the occasional phonemes it can't quite understand.

sampling—Part of the process of turning analog data, such as human speech, into digital form that a computer can manipulate. The analog data is divided into tiny "slices" and assigned a set value that can be represented in digital form.

training—The first step in using any voice recognition package is going through a training process that gives the software an idea of how a particular person sounds when he or she says different words. Thanks to ongoing advancements in the voice recognition field, training time has been reduced with each new software version. Many programs now feature a kind of "on-the-job" training that lets users begin real work much sooner than previously possible.

Create A PC Communication Center

Get The Message Out Using Your Home Or Business PC



Keeping the lines of communication open is a key component to running a successful business. Few people would argue against the fact that customers, clients, and employees must be able to contact you, or your business will suffer.

Successful communication then becomes a matter of determining how many lines of communication you need for your business. Obviously, you need a telephone line for voice calls, preferably with a call-waiting feature for those times when you simultaneously receive more than one call. A line for an Internet connection also is vital for instantaneous e-mail and for finding up-to-the-minute information on the Web. Chances are you'll need a line for a fax machine, as well. An alphanumeric pager and a cellular phone would be helpful, too. If you operate a home-based business, you know the misery of sharing a telephone line with your family, meaning you may need a second (or third) phone line for personal use. Finally, to enhance your communication options, you'll probably need plenty of office hardware, such as a computer (or two), a printer, a scanner, and a copier.

We will need the fingers on both hands to count all those lines of communication—not to mention a desk the size of a small whale to hold all the hardware. Fortunately, one tool among all your communication tools can assume the responsibilities of several others. Not surprisingly, it is the computer.

Turning your computer into a communication powerhouse requires a healthy mixture of software and hardware, but few communication options exist that your computer can't assimilate. We will discuss several communication needs of small or home-based businesses, and we'll show you how to transfer the responsibility for managing those needs to your computer.

■ **Multifunction Devices.** Probably the easiest way to give your computer several communication capabilities is to purchase a multifunction device. A **multifunction device** combines several pieces of peripheral hardware into one device. Most multifunction devices offer a basic combination of printing, faxing, copying, and scanning functions in one machine. Such a combination not only makes your computer's communication options more plentiful but also gives you more space on your desk vs. using three or four pieces of hardware to achieve the same functions.

Multifunction devices, however, have a few drawbacks, such as a high price tag for some of the higher-end machines (about $500 to $1,000 for those with inkjet-printing capabilities). But multifunction devices usually cost less than purchasing each individual piece of hardware. One of the tradeoffs you will make is in speed. Low-end multifunction devices usually are slower when printing and faxing than a comparable standalone printer or fax machine. Another drawback is that if one component in the multifunction device breaks down, you lose access to all the device's functions while you are having it repaired.

Still, owning and using a multifunction device is well worth the potential drawbacks. Most machines are easy to set up and use and most will provide adequate speed and print quality. When searching for multifunction devices, you'll want to determine which aspect of the device you'll use most often (such as the printer or the fax machine) and then find a multifunction device that provides the best speed and quality in that area.

As with printers, you will want to take into consideration the use of supplies, such as how an inkjet multifunction device makes use of its ink. Does it contain a separate black cartridge (which is more efficient) or does it mix cyan, magenta, and yellow to create black?

Key Points

- You can easily turn your home- or small-business computer into a communications command center.
- The easiest way to give your personal or business computer several communication functions is to purchase a multifunction device.
- There are plenty of software- and Web-based products for helping you communicate more efficiently through your PC.

You'll also want to see whether cartridges for the multifunction device are easy to purchase and aren't too expensive. Make sure you can use the device without specialty paper, which is expensive.

As you analyze the various features offered by multifunction devices, you'll want to take note of a few key ones. For faxing, most devices offer personalized speed-dial settings, as well as a redial feature that kicks in when the first call attempt is busy. Most multifunction devices offer their copying and scanning features directly through the fax machine, which means the quality may not be as crisp as you want it. Other devices contain a flatbed for improved copying and scanning quality, but they'll typically cost more. Make sure the device has a large paper tray or more than one paper tray, especially if you expect to receive several faxes while the device is unattended.

Several companies make multifunction devices. We'll now discuss a few devices from the top manufacturers to help you get an idea of what you will find on the market.

OfficeJet R80 & LaserJet 3150

Hewlett-Packard (HP) is the industry's leading manufacturer of printers. Not surprisingly, HP also offers one of the industry's largest collections of multifunction devices. One model that will appeal to many small businesses and home users is the OfficeJet R80, which prints using color inkjet technology. The R80 offers printing, faxing, scanning, and copying capabilities. Its black-and-white print speed of 11ppm (pages per minute), according to HP, is outstanding, and it features an automatic document feeder. HP also offers a wide range of multifunction devices that use laser-printing technology, both color and black and white. The HP LaserJet 3150 is comparable in price to inkjet models, but it doesn't offer color capabilities. This LaserJet prints 6ppm.

Hewlett-Packard
Office Jet R80
$799
LaserJet 3150
$599
(800) 752-0900
(415) 857-1501
http://www.hp.com

MulitPASS C560 & MultiPASS L6000

Canon is another top-level manufacturer of printers and multifunction devices. Canon's MultiPASS C560 multifunction device offers inkjet-printing capabilities and plenty of power. The C560 also has faxing, scanning, and copying capabilities. Canon's multifunction devices ship with powerful software that makes managing them through your computer easy. You will want to make sure you purchase the optional black inkjet cartridge for the C560 to make the printer more efficiently use its ink. This printer prints 5ppm with black ink and 2ppm using colored ink, according to Canon.

The Canon MultiPASS L6000 offers black-and-white laser-printing capabilities. It prints at about 6ppm and can print fax pages at about 6ppm.

Canon USA
MultiPASS C560
$299
MultiPASS L6000
$399
(800) 652-2666
(516) 488-6700
http://www.usa.canon.com

Canon's MultiPASS C560 is an inexpensive multifunction device that provides inkjet-printing, faxing, and scanning capabilities.

MFC-9600

Brother's MFC-9600 laser color multifunction device offers the four traditional functions you would expect to find: printing, faxing, scanning, and copying. But it also offers two other functions: faxing through your computer and video capture. The video capture feature lets you capture images from your computer, VCR, digital camera, or camcorder. You then can print or fax any of the images using the MFC-9600.

Brother International
MFC-9600
$799
(800) 284-4329
(908) 704-1700
http://www.brother.com

Fax To E-mail. If you think a multifunction device would provide more hardware power than you need, consider a specialty piece of hardware, such as a machine that turns printed fax messages into digital images you can easily send via e-mail. By sending such documents through e-mail rather than to a public fax machine, you can ensure sensitive documents won't end up in the wrong hands. Recipients also can see a fax message on their computer screens before deciding whether to print it, which lessens paper clutter. Such specialty devices are expensive, though. The following two products are examples of these specialty machines, and both are for use on networks.

Digital Sender 8100C

HP's Digital Sender 8100C device looks like a fax machine, but it offers several more capabilities. It gives you the ability to send documents via fax or e-mail. The 8100C can access your computer or network's address book, letting you easily select the recipient, or you can build an address book using the 8100C's keypad.

The 8100C can accept nearly any type of document, including black-and-white text documents and color photographs. The documents are included as a file attachment to an e-mail message.

Hewlett-Packard
Digital Sender 8100C
$1,299
(800) 752-0900
(415) 857-1501
http://www.hp.com

DX-2000

Panasonic offers the DX-2000 Network Fax machine for those wanting to send fax messages as e-mail attachments. When receiving faxes, the DX-2000 can automatically route them to the correct e-mail address along the network.

Panasonic
DX-2000 Network Fax
$3,995
(800) 843-0080
(847) 468-4600
http://www.panasonic.com

■ **Faxing.** We've focused most of our discussions to this point on hardware devices, but plenty of software-based solutions are available, too. These applications add plenty of communication options to your computer's lineup. Best of all, most of these solutions are extremely inexpensive . . . some of the most basic features are free. Most software-based solutions for communications are for home and small-businesses users, whereas many specialty hardware solutions are for larger businesses.

Probably the most popular software solution deals with sending and receiving fax messages. Using Web-based services or standalone software, users can send and receive faxes without having a fax machine anywhere in the vicinity. With Web-based faxing services, you typically receive fax messages via e-mail. With software installed on your computer, the faxes may download directly into the software. Regardless of which method you choose, electronically receiving faxes has one major advantage over a fax machine: You can choose to print only certain fax messages, limiting the clutter of paper associated with fax messages. The following are some of your fax options.

Internet-based faxing. Several Web-based services let you send and receive faxes through the Internet and e-mail, and most of the services are free. You'll receive a unique telephone number that you will give to people who want to send faxes to you. Those sending faxes to you will dial the number, just as if they are sending the message to a fax machine, but the message will appear as an attachment to an e-mail message.

eFax.com

The eFax.com World Wide Web site provides free fax receiving and voice-mail services, but you will have to pay a small fee ($4.95 per month) to send e-mail messages. When you receive a fax or voice-mail message, eFax.com will notify you either through e-mail or a call to your wireless device, such as a cell phone or a pager. Voice-mail messages and faxes are sent as e-mail attachments. You will, however, need to use a special application you can download from the eFax.com Web site to view or listen to the messages.

Those who upgrade to eFax.com's premium, fee-based service, called eFax Plus, have the option of using a toll-free number or a number from their local calling area to receive faxes and voice-mail messages. Telephone numbers assigned by eFax.com for those using the free services probably won't be in your local area.

eFax.com
free to receive faxes;
$4.95 per month to send faxes
(877) 332-9266
http://www.efax.com

Brother International's MFC-9600 multifunction device offers color laser printing capabilities.

Fax4Free.com/JFAX.COM

JFAX.COM and Fax4Free.com have combined forces, giving users the ability to send and receive faxes or use voice mail for free. Both Web sites remain available, but when you sign up for service at one site, you'll have the ability to log in to both sites.

The JFAX.COM site offers free reception of voice mail and fax messages, similar to eFax.com's services. However, you probably won't need special software to view or listen to the JFAX.COM messages. JFAX.COM also lets you choose the location from which you want your JFAX telephone number to originate, meaning you might be able to find a local number to use. However, unless you live in a large population area, you probably won't receive a local number because JFAX.COM offers numbers in less than 100 cities around the world.

When you want to send a fax for free, visit Fax4Free.com on the Web. You can enter the fax number you want to dial, your fax message, and a file attachment before clicking the send button. Fax4Free.com will set up a cover page for you. You can send faxes anywhere in the United States, Canada, the United

Use The Hardware You Have

Before you attempt to use any of the hardware or software solutions we discuss in the main article, try using your present hardware configuration to enhance your computer's communication options, even if you don't have a fax machine available. If you have a printer and a scanner, you can use them in tandem to give your PC faxing and copying capabilities.

Faxing. You can use Web-based fax services that we discuss in the main article to receive fax documents through your e-mail account. But what if you have to sign one of those documents and then fax it back to the sender? You can use your scanner to fix this problem. First (if you haven't already), print the document you need to fax. Then write on or sign the document where it's required. Next, place the document on your scanner and scan the image. Now open the scanned image file and send it as a fax document, either through a Web-based faxing service or through fax-sending software.

Copying. You can make multiple copies of a document in much the same manner. Let's say you need 10 copies of a printed document, such as a magazine article, and you don't have time to run to the office supply store. Place the document on your scanner and scan the image. Then open the image file and print as many copies as you need.

Drawbacks. A scanner is a handy piece of hardware for the reasons we described above, but you will find a few drawbacks. First, scanning images and printing them in this manner is a slow process. Scanned images also tend to occupy a lot of storage space on a hard drive.

If you have a fax machine or copier available, you'll probably want to use those machines instead of following the above directions. If you don't have those machines available, though, a printer-scanner combination can be the next best thing. □

Kingdom, and Australia for free. If you want to send faxes to other locations, you can do so for a fee.

Fax4Free.com/JFAX.COM
free
(888) 438-5329
(323) 860-9207
http://www.fax4free.com
http://www.jfax.com

NetMoves

Through NetMoves, which is for high-volume and business users, you can send and receive faxes through e-mail messages for a small fee. NetMoves offers its FaxMailer service for those wanting to send faxes directly from their e-mail accounts. To send a message, all you have to do is send the document you want to fax as an attachment to an e-mail message with the recipient's fax number in the To line. Users will pay a one-time licensing fee (presently $39.95 per user) as well as 10 cents per faxed page in the United States.

NetMoves' FaxCourier service gives users the ability to receive fax messages as attachments to e-mail. FaxCourier works similarly to the services from JFAX.COM and eFax.com that we discussed earlier. FaxCourier is for businesses that receive a large number of faxes that they need to route. Fees for FaxCourier depend on the number of users.

NetMoves
$39.95 licensing fee; 10 cents per faxed page
(800) 828-7115 ext. 3005
http://www.netmoves.com

Computer-based faxing. Several programs let you send and receive faxes directly through your telephone line using your computer. The benefit of using this method is you don't need a fax machine. The drawback of using this method is your phone line frequently will be busy if you send and receive several fax messages per day.

Such fax software gives you the ability to easily add cover pages to your fax messages and manage an address book containing addresses of people to whom you want to send faxes. Sending a document you created in a word processing program is extremely easy with fax software. Simply click the Print command in your program. Then select your fax software from the list of printer drivers and click OK. The fax software will automatically open, letting you fill in the name and fax number of the recipient and send the fax document.

Several software packages provide great features.

Mighty FAX

Mighty FAX from RKS Software is a shareware program. A 30-day trial period provides you with basic fax sending and receiving options. You will need to pay $19.95 to keep the program.

RKS Software
Mighty FAX
$19.95
http://www.rks-software.com

Hewlett-Packard's Digital Sender 8100C lets you transmit fax documents to an e-mail address.

SmartFax 2000

RingCentral's SmartFax 2000 is a solid software package that works in tandem with Microsoft Outlook to manage your communication options.

RingCentral
SmartFax 2000
$29.95
(800) 210-5517
(650) 622-1499
http://www.rzs.com

WinFax Pro 10.0

WinFax Pro 10.0 from Symantec is for those who send and receive several fax messages daily and need extremely strong fax-management tools.

Symantec
WinFax Pro 10.0
$119.95
(800) 441-7234
(408) 253-9600
http://www.symantec.com

(NOTE: If you plan on using Microsoft Fax, which is a free program that automatically installs with Windows 95, you may not be able to find it on your computer if you have Windows 98. You usually can install Microsoft Fax from the Win98 installation CD-ROM by double-clicking the TOOLS, OLDWIN95, MESSAGE, and US directories. Then double-click the Awfax.exe file to begin the installation process. However, if you have Microsoft Outlook 97 or 98 on your computer, you will have to uninstall Outlook before installing Microsoft Fax. You then can reinstall Outlook.)

■ **Copying.** Plenty of small businesses and home offices have a scanner and printer connected to a PC. Few of those offices, though, have a copier available. Although copiers are handy, they also can be expensive to purchase and maintain. In addition, they are bulky.

If you have a printer and scanner available, though, you can use them in tandem to create a makeshift copier. (See the "Use The Hardware You Have" sidebar.)

Photocopier Pro

If you want to simplify the process even further, you can use Nico Cuppen's Photocopier Pro software. Photocopier Pro, which is available for download through the Web, streamlines the process of scanning an image and then printing multiple copies. You can easily manipulate the image using Photocopier Pro, flipping the image, cropping the image, or controlling the scan resolution.

Photocopier Pro is shareware, meaning you can download and try it for free for 30 days. If you decide to keep the software after the trial period, you'll need to pay $15.

Nico Cuppen
Photocopier Pro
$15
(800) 903-4152 (orders only)
http://www124.pair.com/ncuppen/cphome.html

■ **Voice Mail.** If customers are receiving a busy signal, your small business probably is going to become smaller, thanks to a shrinking customer base. Even when your phone is busy because you are using the Internet, though, you can use voice-mail software to give customers the option of leaving a message.

Several Web-based services are available that capture messages from those calling your business. The services then immediately play the messages over your computer speakers, alerting

you to the call. Some services send the messages to your e-mail account, giving you a chance to listen to them. Here are a few of your options.

eVoice

If you're looking for completely free voice mail, eVoice has the service for you. Because eVoice is driven by advertising, the company can offer the service for free. You will have to listen to or view an advertisement before you can access your voice-mail messages.

You access your messages by calling into the eVoice phone network, accessing your e-mail account, or visiting the eVoice Web site. To hear your messages through your computer, you'll need RealAudio software. eVoice will take messages whenever your phone line is busy, no matter why you're using the line. eVoice isn't available everywhere in the United States yet, so you'll want to check the Web site for availability.

Avoid Two Phone Lines

Sharing the telephone line will become a hot-button issue for a home-business entrepreneur and her or his family. Attempting to run a home-based business with one telephone line is virtually impossible. You can subject your clients to constant busy signals when calling you, yet you can't expect your family members to put their lives on hold and give up use of the telephone. And if your business requires Internet access through a phone modem, the problem is magnified quickly.

The obvious solution to phone-sharing problems is having the phone company install a second phone line, but that isn't always the best solution. Instead, you can use your computer and a collection of hardware and software tools to avoid a second line while lessening the load on your phone line and freeing it for more voice calls.

■ High-Speed Internet Access. One option is to move your Internet and e-mail needs to a high-speed Internet connection, such as a DSL (Digital Subscriber Line) or a cable Internet subscription. DSL uses your present phone line to provide Internet access, but it doesn't tie up your telephone line for making and accepting voice calls. In addition, DSL provides higher speeds than those offered by dial-up modems and you are always connected to the Internet, which means you don't have to wait to make a connection. With a cable Internet subscription, you receive Internet access through the same cable that provides your television signal. In addition to freeing your phone line for voice calls, a cable connection provides much faster Internet service (in most instances) than a dial-up modem.

Both types of Internet subscriptions have a few drawbacks, including a higher monthly cost than for a dial-up connection. You'll also need some additional hardware for your PC, and you may have to pay some setup costs. Some locations cannot yet use either type of access, either. Call some local ISPs (Internet service providers) in your area and your local cable television companies for pricing information.

■ Voice Mail. Because you obviously don't want clients to receive busy signals if you have a single line, regardless of whether you're on the Internet or on a voice call, setting up your phone line to take messages is a workable alternative. Some local phone companies offer voice-mail services or call-waiting services that activate whenever the line is busy. Some also let you have your calls forwarded to a cell phone or a pager when the line is busy. However, all these solutions involve a monthly fee.

You can get around this cost by using your computer and some software or Internet services to accept voice mail for free or only a few dollars a month. We discussed several of these options, such as Internet Answering Machine, Call Catcher, and eVoice, in the main story.

■ Efficient Use Of E-mail. Another way to free up your phone line is to make the most of your e-mail program's capabilities

Download e-mail. Rather than reading your e-mail while you're connected to the Internet, download your messages and end your Internet connection before reading and responding to the e-mail. This practice will free your phone to receive voice calls while you're typing responses.

FAX4FREE.COM

fax cover

to: J.T.
fax #: 916 2374470

subject: Very important Message

from: Kyle Schurman
company:
fax #:
phone #: 419 7350289

date: Friday, April 28, 2000 9:28:45 AM Pacific Time

message: Please comment on these sales numbers...

Services such as Fax4Free.com let you receive faxes for free through your e-mail account.

Encourage e-mail messages. Instead of asking your clients to always call with a question or problem, ask them to send you e-mail messages. Then, you will tie up your phone line only while you're downloading messages. However, for this tip to work, you'll need to download your e-mail several times per day, or your clients will go back to using the phone to ensure an immediate response.

Receive faxes through e-mail. Nothing ties up your phone line for several minutes like a fax message consisting of several pages. Through Web-based services such as eFax.com, JFAX.COM, and Fax4Free.com (which are discussed in the main article), though, you can sign up to receive fax messages free through your e-mail account. This is certainly a cheaper option than purchasing a fax machine to receive messages.

Receive industry news. If you use the Web to keep up to date on the latest news in your industry, you're obviously tying up your phone line for long periods of time while you read. As an alternative, many Web sites offer to deliver daily e-mail newsletters or stories that meet your needs directly to your e-mail address so you to read them while you're offline.

As you can see, making use of e-mail's powerful capabilities is a good way to keep your phone line free more often. To make this solution work, you need only convince your family to give you a few minutes of phone time to download your e-mail. □

eVoice
free
(650) 330-3700
http://www.evoice.com

Call Catcher

Pagoo's Call Catcher provides instantaneous notification of voice-mail messages by playing an audio clip on your computer while you continue to use the Internet. (You will need to download some special software from Pagoo to play the messages.) You also can log on to the Pagoo Web site to check your voice-mail messages.

To use Call Catcher, you'll need to sign up at the Pagoo Web site and download the audio software. Pagoo offers Call Catcher for free on a 30-day trial basis, letting you try the service and determine whether it will work for you.

Pagoo
Call Catcher
$3.95 per month
(415) 512-9208
http://www.pagoo.com

Internet Answering Machine

CallWave's Internet Answering Machine software lets you hear voice-mail messages directly through your computer, even while you are connected to the Internet. Internet Answering Machine is extremely easy to set up and use. Once you set up the application to work with your phone's call-forwarding feature, the software will begin capturing your voice-mail messages. Internet Answering Machine does not work to capture voice mail when you are using the phone for a voice call and are not connected to the Internet, though.

RingCentral's SmartFax 2000 fax send and receive software is easy to use, thanks to its graphical interface.

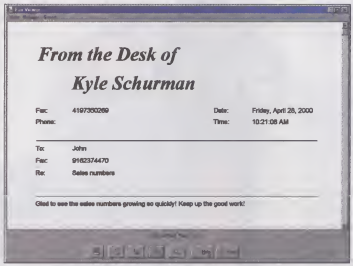
CallWave
Internet Answering Machine
free
http://www.callwave.com

ArialAssistant

If the available voice-mail options are too limited for your liking because they do not give you the option of answering the call before the caller hangs up, you may want to try ArialAssistant from ArialPhone. With ArialAssistant, which is a call-screening application, the caller is asked to state his or her name. The software then plays the name for you through your computer speakers while it puts the caller on hold. Depending on who is calling, you can choose to pick up the call or have the caller leave you a voice-mail message.

Unfortunately, ArialAssistant doesn't work while you are connected to the Internet unless you have two phone lines. You must have one phone line open for ArialAssistant to work. To use ArialAssistant, you'll have to have your computer running, and you will need a voice-compatible modem. You can order ArialAssistant on CD-ROM for $49.95 or download it from the Internet.

ArialPhone
ArialAssistant
$49.95
(847) 573-1553
http://www.arialphone.com



RKS Software's Mighty Fax is a shareware product for sending and receiving faxes. You can try it free for 30 days.

■ Paging.

If your small business keeps track of its employees with pagers, you know the hassle of leaving a voice-mail message and waiting for your employee to find a telephone to return the call. It is especially a hassle when you simply want to give the employee a quick message that is not really urgent.

Wireless HomeOffice

Using your computer to send text messages to alphanumeric pagers is a perfect solution. Wireless HomeOffice software from InfoRad gives you the ability to send messages to any pager. You type your message, select the pager phone number you want to dial, and send the message. The Wireless HomeOffice software will dial the number through your computer's modem, and the recipient will see the message appear on his or her pager.

InfoRad
Wireless HomeOffice
$59
(800) 228-8998
(216) 531-1313
http://www.inforad.com

■ Creating A Communication Center.

By using some of the hardware and software tools we discussed here, you will find it easy to turn your personal or business computer into the center of communications. Most of these solutions are inexpensive, too. You will also find that more streamlined communication management leads to additional free time you can spend helping your business grow.

After implementing some of these changes, you can remove the bulky communication hardware that's no longer needed from your whale of a desk, clearing space to hold all the extra customer invoices you'll be able to generate. Then you can use your new computer communication center to give your customers the details of their invoices by voice mail . . . or by e-mail . . . or by fax . . . LS

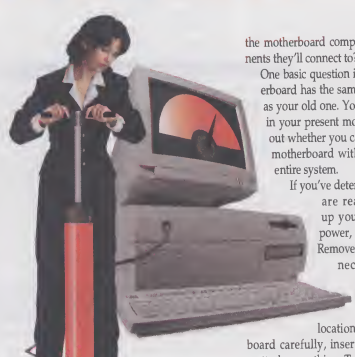
by Kyle Schurman

Boost Your Computer Power

Upgrades & Settings That Speed Up Systems

Power and performance are a PC guru's mantras. While the hype goes to the newest breakthroughs, average users are more interested in getting the most from their existing PC setups than spending hundreds or thousands of dollars on the latest upgrades.

There are myriad ways to bolster your system's capabilities without investing in untried technology. With hardware upgrades, software tweaks, and routine maintenance you can fine-tune almost every aspect of your machine. Some of these tasks are pricey or tricky, and some are simple enough that they should be part of your routine already. The ideas in this article make up a solid overview of how to make your PC faster and more robust. For more details on each of these suggestions, visit http://www.smartcomputing.com and search for relevant articles.



The Soul Of A Machine. When people talk about a PC's power, they're usually talking about its chief components: the motherboard, CPU (central processing unit), RAM (random-access memory) and cache memory, **BIOS** (**Basic Input/Output System**, software that controls fundamental system functions), bus, graphics and sound cards, and ports. These components form a computer system's key elements.

Upgrading these parts will provide more results than anything else you can do. As a rule, these upgrades fall into the "pricey or tricky" category. Before trying them, open your unit's case and examine the components. Learn which components you have and which you can reach before purchasing an item. Once you're familiar with your system, keep reading to learn about each upgrade and what it involves. The descriptions provided here for each upgrade process are minimal, so check the manuals and other articles on our Web site before attempting an upgrade.

Key Points

- Many important hardware upgrades require minimal time, effort, and expense.
- Check your system settings to ensure you're using components effectively.
- Make sure your software is kept current with upgrades and patches.
- Learning a few keystroke shortcuts can speed up your work.

Motherboard. This is your PC's primary circuit board. It houses the CPU, BIOS and other chipsets, and clock. It has slots or connectors for memory modules (with RAM chips), graphics and printer ports, input/output cards, disk controllers, the power supply, and more.

Replacing the motherboard is the ultimate upgrade short of buying a new machine. It also may be the most difficult task. Determining which motherboard you need is the first hurdle. Find out which CPU, chipsets, and slots a new motherboard comes with and which components you'll have to buy. Are the components on the motherboard compatible with the components they'll connect to?

One basic question is whether a new motherboard has the same form factor, or shape, as your old one. You must ensure it will fit in your present motherboard's place. Find out whether you can remove your present motherboard without disassembling the entire system.

If you've determined the answers and are ready to proceed, back up your system, turn off the power, and open the PC's case. Remove the motherboard's connections (screws and cables) and the devices attached to it, noting their locations. Remove the motherboard carefully, insert the replacement, and reattach everything. To make the new motherboard work, you may have to upgrade the power supply, update the BIOS, or edit the CMOS (complementary metal-oxide semiconductor) settings. Looking at the complexity of this process, you can see why you may want to leave installing a new board to an expert.

CPU. You can get most of the advantages of replacing the motherboard by replacing the CPU alone. A faster CPU can give you the added processing speed, measured in clock cycles per second, you're longing for. The latest processors recently broke the 1GHz (gigahertz) barrier in their relentless race to higher speeds.

Your PC's RAM may be its biggest bottleneck, but if you have plenty of RAM and your system seems slow, considering upgrading your CPU. Again, the process begins with answering some questions. What kind of CPU socket does the motherboard have? Each processor connects only to certain socket types. Which chipset do you have and which CPUs are compatible with it? A faster processor from the same family should work.

You'll probably have to remove the motherboard before you can (gently) pry the CPU out and attach its replacement. You'll need to set the clock multiplier, bus speed, or both with

jumpers or DIP switches. You may have to update the BIOS to recognize the processor, or install a voltage regulator so it doesn't burn out. Again, as you can see, this job is best suited for the techno-savvy.

■ Memories Are Made of This.

System memory. If your hard drive spins whenever you do something, it's a sign of inadequate RAM. Your system is writing the contents of its memory to a temporary file on the hard drive known as a **swap file** (which is part of **virtual memory**, or hard drive space acting as RAM) because there's too much data for the RAM chips to hold. Because retrieving data from the hard drive is much slower than retrieving it from RAM, this causes a major performance hit.

Most current PCs have 32MB (megabytes) or 64MB of RAM, but computers with 128MB or 256MB are becoming common. With today's memory-intensive applications, a machine with 16MB or less may suffer from poor performance. Based on RAM's relatively easy installation and low cost of only a couple of dollars per megabyte, it's probably the best upgrade you can do and the first you should contemplate.

Your RAM is located in chips on small plastic circuit boards called SIMMs (single in-line memory modules) or DIMMs (dual in-line memory modules). Before purchasing more RAM, you should determine:

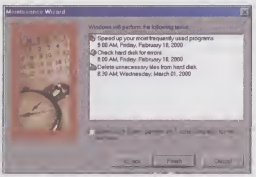
1) Whether your system uses SIMMs or DIMMs and what size (how many pins) their sockets are.
2) How many sockets you have available for more RAM.
3) Whether your system uses DRAM (dynamic RAM) or SRAM (static RAM) chips and what speed they are. DRAM chips are cheaper but slower than SRAM.

If you don't know what kind of RAM you have, check the packing slip that came with your PC. To keep your memory compatible, use only that type of RAM. Installing RAM means putting the SIMMs or DIMMs into empty sockets. If you don't have enough sockets, you may have to switch the present modules with the new, higher-capacity ones.

BIOS. BIOS governs how the CPU initializes, tests, and communicates with other components. Modern BIOSes aren't etched on a chip, so you can update the BIOS as you would any program. Contact your PC or BIOS manufacturer, check whether an upgrade is available, and download and run it.

An enhanced BIOS usually won't boost your system directly, but it will give you access to the latest technology. If your machine's BIOS is too old, for instance, it won't support devices connected by USB (Universal Serial Bus) even if you install a USB port. With the latest BIOS you can use any peripheral hewing to a new standard.

Graphics card. If your graphics are slow in applications such as games, you may need to replace the video card. Many low-end PCs come with 4MB of video RAM, while more expensive systems have 8MB or 16MB. Installing a 3-D accelerator card can increase your video refresh rate significantly.


Maintenance Wizard
Windows will perform the following tasks:
Speed up your most frequently used programs
8:00 AM, Friday, February 18, 2000
Check hard disk for errors
8:00 AM, Friday, February 18, 2000
Delete unnecessary files from hard disk
8:30 AM, Wednesday, March 01, 2000
< Back
Finish
Cancel

The Windows Maintenance Wizard lets you automate the ScanDisk, Disk Defragmenter, and Disk Cleanup utilities.

■ Spinnin' Round & Round.

Hard drive. Newer hard drives have faster spin rates and access times, but the main reason to upgrade a drive is a lack of space. Space becomes a productivity issue when you start running out of it. Without enough room, you won't be able to install new software without deleting old software or moving it to diskette. Also, Windows and some applications need disk space in which to write temporary files. If you run out of disk space in the middle of an operation, you may have to search for programs, backup files, and temp files you can delete.

As with other components, installing a hard drive is a matter of finding a model compatible with yours, detaching the old drive, and attaching the new one. You may have to update the BIOS to recognize the drive, **partition** the drive (divide it into discrete sections), or format it. The drive should come with an installation routine to guide you through this.

Unless you have saved all the data on your system to a tape drive or other media, the toughest challenge may be moving your files from the old drive to the new one. You may be better off installing a second hard drive. Since the new drive should be quicker, place Windows there and make it the drive you boot from. Put the programs you run most often on this drive and use the old drive for seldom-used software or backups.

CD-ROM, DVD-ROM. If you run games or applications from your CD-ROM (compact disc, read-only memory) drive, you'll want a drive with the fastest access times. As their designations suggest, a 32X or 48X drive spins many times faster than a 2X or 4X drive. But if you use your CD-ROM drive only to install programs or play music, a speedier drive won't help much.

A DVD (digital versatile disc) can hold an entire movie with its 4.7GB (gigabyte) to 17GB storage capacity (compared to a CD-ROM's 650MB). Most software isn't available on DVD, but many people think DVDs will supplant CDs as the standard for data distribution. If you're thinking of upgrading your CD-ROM drive, you may want to get a drive that can read DVDs too.

If you're planning to upgrade, consider getting a CD-R (recordable CD) or DVD-RW (rewriteable DVD) drive so you can create disks for archiving or distributing data. The ability to write large amounts of data to disk can simplify your transmission and backup routines.

High-capacity cartridges. If you're still using 3.5-inch (or the older 5.25-inch) diskettes for any serious purpose, you're probably spending a lot of time juggling diskettes. If not, you're probably avoiding chores you should be doing, such as backup. In these cases a Zip or other high-capacity drive can be a godsend.

Most people can store all their data on a few 100MB Zip cartridges. They can create a backup routine with Windows Backup or a third-party utility, insert a Zip disk, and start saving data. The same routine might require 10 or 20 1.44MB diskettes.

Like recordable CDs and DVDs, Zip disks are handy for transporting data or transferring it between PCs. If you've ever tried to upload or download a huge file, you'll appreciate the convenience of moving it on a Zip disk instead.

■ On The Periphery.

Upgrading or replacing the other devices attached to your computer can enhance performance also. Some of the following techniques will make your system perform better, while others will make you perform better.

Monitor. If your work involves graphics design, you may need to see long or wide

documents at a glance. Consider getting an extra-large monitor—perhaps one you can rotate horizontally or vertically. It'll be expensive, but it can save you an inordinate amount of time scrolling back and forth.

A second monitor may be useful if you work with multiple documents. You can use a switch to toggle between monitors, and you can even set them up so you can drag a document from one monitor to the other.

Input devices. Most people use the PC's keyboard and mouse without thinking, but you should give them a thought. If you type for extended periods, consider a contoured or "flex" keyboard instead of a standard model. These ergonomically correct keyboards can reduce the strain on your hands, making you more productive.

A mouse can hurt your hands even more. Some mice have built-in wheels so you can scroll up and down the display by moving your fingers rather than hands. If the constant reaching and grasping bothers your hands, consider replacing the mouse with a trackball, touchpad, or pointing stick—either built into the keyboard or designed as a separate unit.

Most keyboards are too cheap to be worth fixing. If a standard keyboard acts up, buy a new one. But if your mouse creates problems, try taking it apart and cleaning it. That can put the zip back in your cursor movement.

Poor typists can take heart in the fact that speech recognition programs have advanced considerably. You might benefit from getting one and "training" it to understand your voice rather than learning to type better.

Modem. If you're still using a 28.8Kbps (kilobits per second) or 33.6Kbps modem, it may be a programmable unit you can upgrade to 56Kbps with a manufacturer's download. If not, a replacement modem won't cost much.

Printer. New printers come with 4MB or more of RAM, but older printers may have 1MB or less. These printers may generate an "out of memory" error when you try to print a large or complex graphic. As with your computer, you can upgrade some printers with RAM. If you can't or don't want to install printer RAM and your work is print-intensive, it may be worth getting a more powerful printer.

Scanner. Scanners can be more than a fun way to put your snapshots online. Another helpful feature is their ability to scan documents as images and then turn them to editable text with the OCR (optical character recognition) software that comes with most scanners. This can eliminate time-consuming data entry. Another technique is to convert pages to images so you can send them by fax or e-mail with an internal modem.

■ **Soft & Suite.** Software speed-up tips have the advantage of costing little and being easy to do. They can boost processing, improve access to memory, or simplify the system—all without requiring you to disassemble your PC or get your hands dirty.

Upgrade Windows. If you're still using Windows 3.x or Windows 95, upgrade to Windows 98. The newer operating system may not be faster, but it's more stable, so you won't lose data or have to reboot your machine as often. Win98 also features utilities and tools such as the integrated Web browser that make it friendlier than its predecessors.

Another advantage of upgrading Windows is that it may clean out some of the extraneous files that have accumulated on your PC. After installing and uninstalling dozens of applications, you probably have pieces of programs scattered throughout your system in your **Registry** (which contains key Windows settings); Autoexec.bat, Config.sys, and .INI files; and the WINDOWS folder. Any of these may cause processing delays or conflicts.

When installing or upgrading Windows, choose the Custom installation option. Examine the components Windows proposes to install and uncheck those you don't need.

Upgrade applications. If new versions of your software exist, they're usually (but not always) quicker than previous versions. They also add features and correct bugs that may cause problems. A full upgrade for something such as Microsoft Office can be expensive, but for many programs, including Windows, you can download free upgrades and patches.

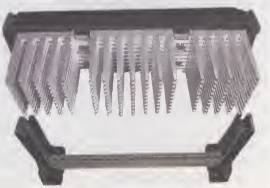
Upgrade drivers. Most devices connected to your PC come with files called device drivers that contain instructions telling the system how to operate the device. Examples include your graphics card, printer, or Direct X games. You can go to the manufacturer's Web site for most items and download new drivers. The drivers may increase speed, fix bugs, add features, or provide support for the latest technology.

Regular maintenance. Several Windows utilities can keep your PC tuned. ScanDisk checks your hard drive for errors. Disk Defragmenter rearranges files the system has split into segments in order to create a more efficient disk layout. Disk Cleanup deletes unnecessary files such as temporary files, downloaded program files, and files in the Recycle Bin.

Disk Defragmenter should be the most helpful tool. The more fragmented your drive, the farther the read-write head must travel to read pieces of a file. Disk Defragmenter has an option to group the applications you use most near the beginning of the drive, further reducing access times.

You can find these utilities on Windows' Start menu under Programs, Accessories, and System Tools. To run them all, use the Maintenance Wizard on the same submenu. Better yet, automate these maintenance tasks by using the Task Scheduler under Scheduled Tasks. Schedule them to run weekly or monthly, when your PC will be on and you're not using it.

Depending on whether your motherboard supports Slot 1 (below) or Socket 7 upgrades, you'll install a new CPU differently.



Set Systems Straight. You can optimize many Windows settings to streamline your work. To reach these settings, click Settings and Control Panel on the Start menu. Double-click System and select the Performance tab.

Click the File System button. On the Hard Disk tab, change the PC's typical role to Network Server if you have more than 16MB of RAM. This enlarges the file and directory cache, which steps up disk access. Also click and drag the Read-ahead Optimization slider to Full.

On the Floppy Disk tab, uncheck the box to search for new diskette drives attached to your computer. This eliminates some processing during startup.

On the CD-ROM tab, click and drag the Supplemental Cache Size slider to Large. This boosts the amount of data the machine reads and transfers from its disk drives. Click OK to exit the File System section.

Now click the Graphics button. Click and drag the hardware acceleration slider to Full if it isn't there already. This expands the use of the accelerator functions built into your graphics card. Click OK.

Next, click the Virtual Memory button. Click the option to specify virtual memory settings. If you have more than one hard drive, select the fastest one. If your drive is larger than 1GB or 2GB, set the minimum and maximum to 128.

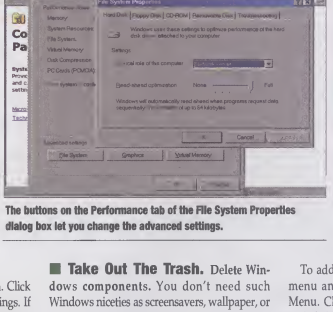
By setting the min and max to the same value, you've fixed the swap file's size at 128MB, which is big enough for most purposes. It curtails virtual memory resizing, disk swapping, and disk access because Windows doesn't keep trying to optimize the swap file. Select OK to exit the Virtual Memory section.

A similar idea is to fix the size of the disk cache in RAM so Windows won't keep resizing it. To do this, run Notepad by clicking Start, Programs, Accessories, and Notepad. Open the file C:\WINDOWS\System.ini. (You'll probably have to change the Files Of Type drop-down box selection to All Files in order to see System.ini among the listed files.) Search for a section labeled [vcache]. If it's not there, add a [vcache] line at the end of the file. Below this line add the following two lines:

```
MinFileCache=xxx
MaxFileCache=xxx
```

For the values, substitute a number for "xxx" according to the following chart:

System RAM	Min	Max
16MB	1024	4096
32MB	2048	6144
64MB	4096	16384
128MB+	4096	32768



The buttons on the Performance tab of the File System Properties dialog box let you change the advanced settings.

Take Out The Trash. Delete Windows components. You don't need such Windows niceties as screensavers, wallpaper, or sound schemes. Each takes time to load and uses memory to stay active. To delete them, open Control Panel. The sound scheme is under Sounds, and the screensaver and wallpaper are under the Display icon. Under Display on the Settings tab, you can lower the number of colors you use, especially if you don't work often with graphics. You won't notice much difference, and your PC will consume less memory.

Uninstall programs. Whenever you're sure you won't use a program again, uninstall it. Go to Control Panel, choose Add/Remove Programs, and go through the uninstall process.

Deleting software will help you in several ways. Your system won't spend time reading the Registry and setting up each application. Programs won't induce conflicts with other programs. Files won't take up disk space and cause fragmentation. Another bonus is that when a program is gone, you won't come across it again, wonder whether you need it, and waste time investigating it.

Set up your Desktop. To run an application quickly, put a shortcut for it on your Desktop. To do this, run Windows Explorer. Find the program's folder and the executable file that runs the software. For instance, Microsoft Word's executable file might reside in the \PROGRAM FILES \MICRO-SOFT OFFICE\OFFICE folder with a file name of Winword.exe.

Click the .EXE file, convert Explorer to a window, and drag the .EXE file to the Desktop. Windows will create a shortcut to the program. Many users also create a shortcut for Explorer because this utility often comes in handy. Explorer's executable file is WINDOWS\Explorer.exe.

While you're on the Desktop, you can edit the Taskbar so it remains hidden except when you want it. Right-click the Taskbar on the bottom of the screen and select Properties. Check the boxes for Always On Top and Auto Hide. This keeps the Taskbar from permanently disappearing.

Startup. People often run the same applications every time they turn on their computer. To save you from having to launch each program manually, put frequently used items in your Startup folder. That way they'll be active when the initialization finishes.

To add programs to Startup, open the Start menu and select Settings, Taskbar & Start Menu. Choose the Start Menu Programs tab and click the Advanced button. Click the plus sign next to Programs to expand the display and click the Startup folder near the bottom.

This shows you what's currently in Startup. To add an item, hold the CTRL key down while you drag the item from the Desktop or Explorer. Drop it in the Startup folder.

While you're here, delete any items you don't want or recognize, such as Microsoft Office's Fast Find. Many vendors (wrongly) assume you'll want to run their software every time you log on. The presence of these programs in Startup slows your initialization routine and hogs some of your valuable memory.

Keyboard shortcuts. Knowing your way around your PC can bolster productivity. Familiarity with the most useful commands will prevent you from tabbing through menus or keeping programs open unnecessarily.

Some common keyboard commands in Windows are:

ALT-TAB: Toggles you among open applications.

CTRL-ESC: Calls up the Start menu from any application, including a DOS program.

ALT-F4: Closes the present application.

CTRL-ALT-DEL: This doesn't reboot your machine automatically, as it used to, but calls up a Close Program dialog box. If an entry in this box has a "Not responding" label beside it, the program is frozen, and you can end it without shutting down the computer. You also can close tasks that aren't frozen but are taking too long.

If your keyboard has a key with the Windows logo on it, you can add these commands to your repertoire:

Windows-D: Minimizes all open windows and brings up the desktop.

Windows-E: Opens Windows Explorer.

Windows-F: Opens Find (to locate files).

Windows-L: Logs off Windows.

DOS. If you abandoned DOS long ago, give it another look. You still can do many things faster at the command prompt than in Windows. Consider the steps involved in copying a file to diskette via Windows. You have to open Explorer . . . find the file in one window . . . find the A: drive in the other pane . . . find the file again, because you lost it when you clicked the A: icon . . . and finally drag the file from one pane to the other.

A one-line DOS command such as **copy \word\temp.doc a:** beats this handily. The savings multiply if you're working with a group of similar files. Compare **copy \word*.doc a:** to the time involved in locating .DOC files in a folder of mixed contents, highlighting the right files, and moving them in Explorer.

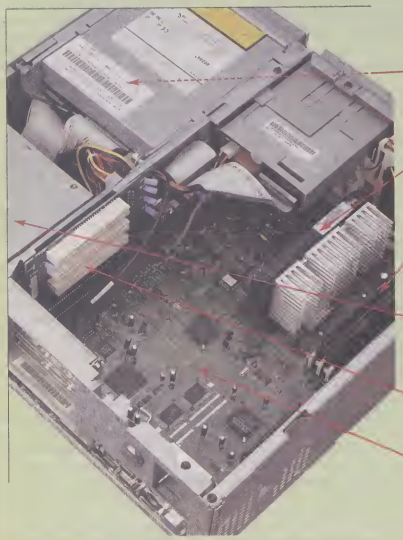
You can automate tasks such as this by creating a DOS batch file. In this case, type **edit copydoc.bat** at the DOS prompt. Enter **copy \word*.doc a:** and press ALT-F and X. Answer "yes" when you're asked whether you want to save the file. To run the batch file, type **copydoc** at the prompt.

Use third-party utilities. Third-party software can raise productivity noticeably. For instance, Norton System Works gives you Norton AntiVirus (no time lost to virus infections), Norton CrashGuard (permits recovery from most crashes), Norton's Unerase Wizard (restores deleted files, even when you can't find them in the Recycle Bin), and more. File management programs can replace the Windows Desktop or Explorer with a more robust tool. Macro programs can compress a long sequence of commands into one key combination.

You can get Windows add-ons and other products as shareware from sites such as Download.com and Shareware.com.

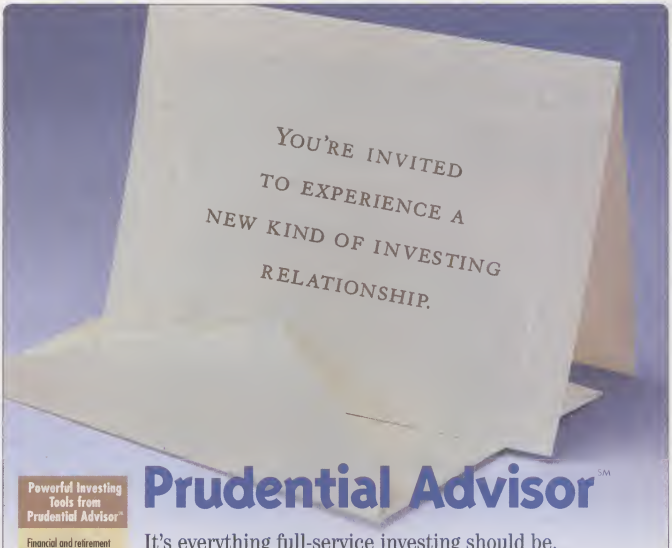
No one download or fix described in this story will revolutionize your PC's performance. But trying the tips that work for you can create a noticeable boost in your daily work. LS

by Robert Schmidt



Inside Your Computer

- The **hard drive** is the long-term storage medium for most PCs. Newer hard drives can store from four to 25 or more gigabytes of information. (Located under the CD-ROM drive.)
- The **CPU (central processing unit)** is the microprocessor that is considered the "brains" of the computer. It processes software instructions and carries out the user's commands.
- **RAM (random-access memory)** chips are the workplace that temporarily holds data while the computer is working with it. All the contents in RAM are lost when the computer is turned off.
- The **power supply** is a small sealed box inside the computer case that takes AC power from your wall socket and converts it into the DC power used by the computer.
- **Expansion Slots** are openings on the motherboard where you can plug in cards that add more functionality to your system.
- The **motherboard** is the main circuit board inside the computer case. It provides electrical connections and communication pathways to the various parts of your PC.



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Perform Regular PC Maintenance

Keep Your Machine Running Clean

Odds are that the car you keep in your garage or driveway is in pretty good shape. Most of us try to make sure the fluids are topped off, exhaust system is intact, tire pressure is up to snuff, and filters are recently cleaned or replaced. After all, your automobile is a valuable tool and a significant investment; you rely on it to start up in the morning and get you where you need to go. Therefore, you make every effort to ensure that it's running efficiently, and you regularly take such steps as you can afford to keep your car purring happily down the road.

Shouldn't your computer, another valuable tool, get the same kid-glove treatment?

It should, and even if you're not a card-carrying technophile, you can make sure that it does. A computer is a complex piece of technology upon which you've come to rely for both work and play. Fortunately, there are a host of tools and techniques available to help you keep your computer "tuned" and running smoothly just like the car in your driveway.

■ **Maintenance vs. Troubleshooting.** First, just as you would with a car, let's differentiate between proactive maintenance and emergency troubleshooting.

In the first case, we're talking about techniques to keep your computer running efficiently. These are regular maintenance items, akin to checking your car's tire pressure and fluid levels, that you can and should perform on a regular basis to help your computer run as efficiently as it can.

In the latter case, the assumption is that you're dealing with an actual problem: Your computer seems to have slowed down, you're suddenly having trouble connecting to the Internet, your printer stops working, or perhaps a program that used to run just fine now refuses to run at all. In other words, something failed in spite of normal maintenance, or perhaps because of a lack of such maintenance. Troubleshooting can quickly point to a need to repair or upgrade your hardware or software; some, but not all, of those undertakings are beyond the scope of this article. When we get to that point, we'll let you know when you're better off letting a pro tackle such repairs.

Key Points

- Performing routine maintenance on your PC helps prevent slowdowns and breakdowns.
- Put your PC on a regular schedule and follow the 10-step checklist provided here.

■ **The Major Culprits.** Let's face it, many of the desktop PCs in America are not running as smoothly and efficiently as they could. Why not? Rudy Lopes, director of internal systems for a large publisher located in Fort Worth, Texas, thinks he knows the answer. "I see it as a question of basics," he says. Lopes cautions users, "Regularly dump the TEMP folder and regularly defragment your hard drive." And he says one more thing: "Keep your virus definitions current!" The latter issue would seem to be self-evident but, as Lopes points out, we regularly hear of two-year-old viruses wiping out computers, even in corporate America, where most computers are maintained by professionals.

To Lopes' list we would add one more item: A significant percentage of system degradation or outright failure is caused not, as you might assume, by incorrectly installing software, but by incorrectly *uninstalling* software.

We'll deal with all of these issues, and several others, as we work up a regular maintenance schedule. For now, we'll just point out that this is a classic good news/bad news situation.

On the one hand, these issues are very common, so some degree of system degradation, such as inefficient use of memory, or the slowing down of some applications, or even outright failure, such as an application or operating system crash, is found on a large percentage of home and office computers.

But (here comes the good news), all of these common issues are easily addressed, and it doesn't normally require a visit to the "PC doctor" to resolve them.

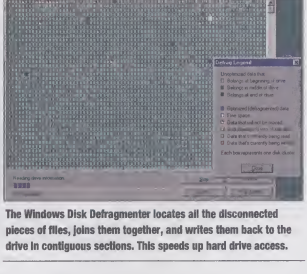
■ **A Maintenance Schedule.** As with your car, your computer should be on a regular maintenance schedule. At least every few months, and preferably every week or two, take a few minutes to perform the 10 maintenance tasks listed below:

1. Defragment your hard drive(s).
2. Scan your hard drive(s) for disk errors.
3. Clean up the contents of the C:/WINDOWS/TEMP folder (or whatever letter drive you designate as your hard drive).
4. Delete any unwanted files.
5. Update your virus definitions.
6. Clean your monitor, keyboard, and mouse or trackball.
7. Clean the dust out of your CPU.
8. Ensure that cards (memory, video, etc.) in the CPU are correctly inserted.

9. Check to be sure you've got up-to-date drivers.
10. Clean up the Windows Registry.

If the list above seems like a daunting collection of tasks, relax. First of all, they're all simple enough, even for someone with no aspirations of becoming a propeller-head. Better yet, many of them can be automated; you can set up Windows to take care of them for you, and you won't even have to think about them again.

Although some of these items might sound mysterious and technical, going through the list one at a time should remove the mystery.



The Windows Disk Defragmenter locates all the disconnected pieces of files, joins them together, and writes them back to the drive in contiguous sections. This speeds up hard drive access.

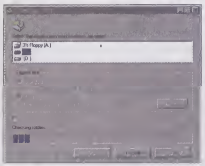
1. Defragmenting Your Hard Drive. The term "defragment" (or defrag, to use the expression the techies use) sounds as though your hard drive has been physically chewing itself into little pieces, but that's not what has actually happened. When you save (and resave) a file, the data from that file doesn't always end up in one discrete, contiguous place on the hard drive. Instead, the system will often scatter chunks of the file all over your hard drive, and Windows uses FAT (file allocation table) to keep track of which pieces are where.

Sounds messy, doesn't it? Generally speaking, it's not really a problem. But over time it can slow down your computer because the drive head will have to search all over the drive to find the pieces of a file. And the system will also take more time when *saving* a file, because the head has to skip around again, looking for unoccupied pieces of hard drive on which to save the file.

The solution is included as part of a suite of Windows System Tools. If you click your Start button and go to Programs, Accessories, and System Tools, you'll see a menu option labeled Disk Defragmenter.

This handy tool swaps the various pieces of files around, putting the fragments back together. The result is faster drive access. Be prepared to wait, though. Disk Defragmenter can easily take 30 or 40 minutes to run, and on today's larger drives, the utility may churn away for as many as two hours, especially if you have other programs running at the same time. (Not a smart move, by the way. It's best to run utilities, such as Disk Defragmenter, only after all other applications have been shut down.)

2. Scanning For Errors. Your hard drive is a sophisticated assortment of electronics, electromechanical parts, and magnetic media. Like any electromechanical device, it is subject to wear and tear, and occasionally portions of the magnetic medium upon which your data is stored will become damaged. ScanDisk, another one of the Windows System Tools suite, is designed to check your hard drive for any such damage. It is remarkably good at detecting damaged areas and then moving recoverable data from those areas and placing it elsewhere on the hard drive. Some authorities believe ScanDisk to be the single most important utility in the suite and suggest that it should be the first place a user should turn when confronted with a program that suddenly refuses to run or a data file that can no longer be re-trieved. In fact, if your system ever crashes, or loses power while you're running an application, chances are that when you restart your computer, a DOS version of ScanDisk will run automatically.



ScanDisk examines your hard drive, searching for physical and logical errors. When it finds errors, it moves data to undamaged areas of the drive.

Like Disk Defragmenter, you can invoke ScanDisk by using your Start button and choosing Programs, Accessories, and then System Tools. Click ScanDisk, and you'll be presented with a small application window. From here you can decide which drive(s) to scan (you might as well check them all) and whether to also check the surface of the disks in the drive for physical errors (sure, why not?). You'll also see a checkbox to mark if you want ScanDisk to automatically fix any errors it finds. Go ahead and check it. If the utility finds physical errors, it will attempt to correct them; at the very least, it will move files off the affected area and mark that area as unsafe for use.

3. Clean Up The C:/WINDOWS /TEMP Folder. Many Windows applications save temporary files in a folder called TEMP, located in the WINDOWS directory, which is almost always on the C: drive. If they're well behaved, the applications will erase these Temp files when they shut down. But if an application is not well behaved, or if your system crashes *before* the application can shut down correctly, these files will remain. Over time, they'll clog up your hard drive, slowing down your system and taking up valuable space.

The solution is simple. Delete them.

Most Temp files end with the .TMP suffix, and many begin with a tilde (~), so they're normally easy to spot. Go into Windows Explorer, *not* Internet Explorer (Start, Programs, Windows Explorer). In the Exploring window, click the plus (+) sign next to the WINDOWS folder to expand the listing for that folder. Near the bottom of the list, you'll see the TEMP folder. Click it, and in the right-hand panel, you'll see a list of files. Select all of the files with names beginning with a tilde and/or ending with the .TMP extension. You can select multiple files by holding down the SHIFT key while clicking the filename. Then either press the DEL key, or right-click and choose Delete from the menu that pops up near the mouse-pointer.

Be careful when deleting these (or any) files! You don't want to accidentally delete something important. Stick to files that begin with a tilde or end with .TMP. See the next section for more information about deleting other files.

4. Deleting Other Unwanted Files. This maintenance task is really just an extension of the previous one. In both cases, what you're

really doing is getting rid of files that are of no more use to you, and that are taking up space on your hard drive.

In this case, though, you won't always know where the files are hiding. After all, you could have saved, installed, or downloaded files *anywhere* on your hard drive. So the first thing you have to do is find the unwanted files.

There is another utility that will help you out with part of this task. It's called Disk Cleanup, and it will find and delete several types of files for you, including:

- Your Temp files
- Temporary Internet files
- Downloaded program files
- Files currently in the Recycle Bin

So, why should you have to worry about deleting Temp files if there's a utility to do it for you? Well, because there are some limitations to how Disk Cleanup handles this task. First, it deletes only files that end with the .TMP file extension and only if those files haven't been modified for longer than one week. So, newer files, or files that may begin with a tilde but don't end with .TMP, will be missed.

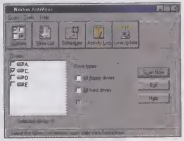
The temporary Internet files that your browser collects are there for an important purpose, but depending on just how graphics-intensive they are, they can take up a lot of space. Your browser caches these files so that, when you return to a particular Web page, the page, and its attendant graphics, will load much more quickly than if it had to be downloaded from the Internet all over again. Disk Cleanup will delete these cached files for you. But the next time you return to a favorite Web site, it may load more slowly than it did the last time you visited.

In addition to using Disk Cleanup to delete these files, you can set your browser to clean up this cache on a regular basis, or you can delete them right from the browser. In Internet Explorer, go to Tools, Internet Options. In Netscape Navigator, go to Edit, Preferences, and then choose Advanced. From there you can tell your browser how often to clean out the cached files.

Disk Cleanup can also delete Downloaded Program files for you. These are applications you downloaded from the Internet that you may no longer need. Usually, you download an installation file and run that installer, which actually places the application on your system. Once the application has been installed, you normally don't need to keep the installer itself.

Finally, Disk Cleanup will delete any files in your Recycle Bin. Remember that when you delete a file, it doesn't really get erased until you've gone into the Recycle Bin (or Windows Explorer) and clicked Empty Recycle Bin. Although you can do this manually, Disk Cleanup will also do it for you.

There are other methods and other System Tools you can use besides Disk Cleanup to delete files for you. Most commonly, you can simply open up Windows Explorer, point to a file or folder, and click the DEL key. But be *very* careful. Windows will let you delete almost any file, including files that you really need! So, if you're sure the document you've selected is that nasty note to your boss you wisely decided not to send, go ahead and delete it. If you're not sure what it is, leave it alone or get some help from a professional.



Norton's AntiVirus automatically checks a variety of file types for viruses. Upon discovering a virus, it can alert you or automatically delete infected files.

5. Update Your Virus Definitions. Time was when viruses were rare and seldom encountered by the typical user. Things have changed, in large part because of the Internet. You can think of the Internet as the world's largest digital petri dish. As a tool to enhance the exchange of information, the Internet is unparalleled; but it's just as effective as a medium of infection.

There are several effective virus-checkers: Norton AntiVirus and McAfee's VirusScan are probably the two most popular such tools. They do an excellent job, as long as you remember to do two things. First, you must actually *use* the tool. It's amazing how many people purchase a tool like this and then rarely use it. Second, to do their job, these tools read in definitions of current viruses. As viruses change, and as completely new viruses are created, the makers of antivirus software send out updated definitions lists. It's up to you to update your antivirus software regularly. Ironically, this is now quite easy to do over the Internet. Yes, the very technology that helps spread viruses also helps to contain them.

You would think that people would a) purchase antivirus tools, b) use them, and c) keep the definition files up to date. But, as Lopes noted earlier, that's not necessarily the case. And Larry Wichman, microcomputer support specialist at the University of Nebraska, makes the same point. He counts out-of-date virus definition files as *the* number one cause of system crashes on the hundreds of computers for which he's responsible.

The moral of the story is don't be lazy. Acquire a reliable antivirus tool and keep its definitions file up to date. It's easy enough to do. Most of these tools include a button that will link you to the publisher's Web site and automatically download the latest definitions file. Norton's is called Live Update, and it's very easy to use. Click a button or two, and go pour a cup of coffee. By the time you return, it's finished.

6. Clean Your Monitor, Keyboard & Mouse Or Trackball. Repeat this to yourself: Water is bad, *very* bad, for computers. Ditto for coffee, tea, Coke and Mountain Dew, and any number of other liquid refreshments that might come to mind. And ask any technical support representative about the user who hung a beautiful plant in a lovely planter directly above his or her computer or monitor and who then proceeded to *water* the plant as it hung innocently, but perilously, over that expensive piece of equipment. We know you're careful when you set your cup of coffee down next to your brand new laptop, but your cat, dog, or three-year-old may not be nearly as careful.

But if you can't use water to clean your computer equipment, what can you use? There are several safe and appropriate cleaning materials out there, including spray cans of air, such as Dust-Off and Canned Air, to blow gunk out of keyboards. You'll also find spray-and-wipe cleaners, such as Endust, which comes in both a spray can and an antistatic wipe. These cleaners will do a good job on computer cases, monitors, and monitor screens, including notebooks and notebook screens and mice or trackballs.

Once the application has been installed, you normally don't need to keep the installer itself

Your mouse is a simple device, and it's easy to clean. Just take off the retainer, remove the ball, and clean the ball and any internal rollers or contacts.

(NOTE: Do not use Windex or other glass cleaners on your monitor. The glass is coated, and the harsh cleansing agents, often ammonia, in them will destroy the coating. Stick with a damp (damp, not wet!) cloth or an antistatic wipe or spray designed specifically for this purpose.)

Cleaning your keyboard. Keyboards get messy. All kinds of stuff finds its way into your keyboard: dust, bits of food, pieces of eraser, pencil shavings, etc. You name it, and it can drop or blow into your keyboard. A few good blasts of canned air will clean most of the dust out of the areas between the keys, but for a thorough cleaning job, you'll need to take the keyboard apart. It's not at all complicated. Undo a few screws, then carefully lift the keypad frame out of its casing. Blow out both parts and wipe down with a damp cloth. Put it back together very gently, and put the screws back in.

If this sounds like more than you want to mess with, don't worry about it. For a few bucks, your local computer store will do it for you. If it's a mom-and-pop store, and there are still some around, they'll be overjoyed at the chance to prove that they can often offer better, quicker, or more personalized service than can most of the retail giants.

Cleaning your mouse. A standard mouse is an ingenious but very simple tool. Perhaps its simplicity is in fact what makes it so ingenious. Moving the mouse makes the ball inside it roll, and that in turn moves rollers that translate that movement into screen coordinates. The result? Your cursor or pointer scampers happily around on the screen. An optical mouse works similarly, except that instead of rollers, the movement is measured against a precalibrated grid, so there are fewer moving parts.

The most common problem with a mouse or trackball is dirt or lint trapped inside. Fortunately, both are easy to clean.

To clean the mouse, simply turn it upside down, twist loose the retainer, flip the mouse over, and let the ball drop out onto your hand or a table. Blow out the mouse with your handy can of compressed air. Clean the rollers or contacts inside with a damp cloth and make sure there are no clumps of lint or dust remaining. Reassemble the ball and retainer, and you're in business. You'll clean a trackball, which is nothing more than a redesigned and upside-down mouse, in a similar fashion.

7. Cleaning Out Your CPU. The dust that you may find in your mouse or keyboard is nothing compared to what can get into your CPU, or central processing unit. Why? Because the CPU contains a cooling fan. The fan ensures that cool air is drawn across components (more about that in a moment) that might be damaged by heat. That cool air, though, comes from outside, and it can be laden with dust, grit, lint, etc., all of which get deposited onto the components inside the CPU.

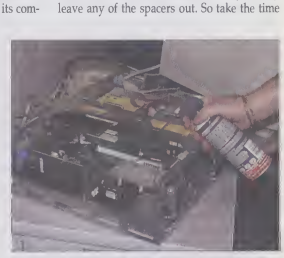
Fortunately, the solution is simple: 1) Disconnect the power, meaning unplug the computer. Simply turning the computer off is not good enough. Please trust us on this. 2) Generally, a few screws hold on the case. Undo them and slide the case off of the chassis, which is the frame within which the components, such as memory, cards, and fan, are mounted. 3) Now that the chassis and its components are exposed, blow them out with compressed air. If the dust is especially heavy, and it can get to the point where it begins to look like a layer of insulation, wipe the inside of the chassis and case down with a damp (not wet!) cloth.

All finished? Before you put the cover back on, see the next section.

8. Check Cards Inside Of CPU. The large circuit board mounted on the chassis is called the motherboard, and attached to it are several different kinds of sockets, or slots. Cards (modem, memory, video, etc.) are inserted into the slots and, therefore, connected to the motherboard. Ideally, the cards are firmly inserted and held down with a screw fastened, usually, to the rear of the chassis.

As the computer heats up and then cools down, the metal and plastic inside expand and contract. This repeated expansion and contraction can eventually loosen cards, especially if they're not screwed down. Press down firmly on each card to be sure that it's seated correctly. If in doubt, unscrew the card and gently rock it to and fro. As long as you've got it unscrewed, you might as well take the card out, rock it back and forth while lifting gently, and clean the contacts. You can use special contact cleaner that you buy at an electronics or computer store, but most techies, believe it or not, use a dollar bill to wipe off the gold contacts at the edge of the card. Reinsert the card by slipping one corner in, then rocking the card back and forth while pressing gently but firmly on the card. Now that you know the cards can loosen over time, don't forget to screw the fastener back down.

While we're talking about cards, this may be a good point to dispel a myth. You know those little covers or spacers that fill in the spaces at the back of the chassis when there's no card present? You may have thought that if you left one out, it didn't really matter, and it might in fact be beneficial, because it allowed air to flow through the chassis more easily. Well, you thought wrong. The case and chassis are engineered so that a certain amount of air flows over certain components. By leaving out the spacers, it's possible you're disrupting that airflow. In fact, although it's not normally the case with typical desktop machines, Hewlett-Packard warns that users of its servers can void the warranty if they leave any of the spacers out. So take the time



Cans of compressed air are available at hobby and electronics stores, and they're great for blowing the dust and other particles out of your CPU or keyboard.

to tighten down the cards and replace any missing spacers.

Everything all nice and tight? Ok, *now* you can put the cover back on.

9. Be Sure You Have Up-To-Date Drivers. Most of the peripherals that connect to your computer, such as mice, Web cams, external drives, printers, modems, and video cards, don't, in and of themselves, know how to communicate with your computer. They use a piece of utility software called a driver, which establishes the protocol by which the computer and the peripheral will communicate.

If you remove the spacers from the expansion slots, you may actually disrupt the airflow in the PC.

This is not a bad system, since it lets third-party manufacturers build peripherals, such as the ones noted above, and know that these peripherals will be able to communicate with a variety of computers. But there is a downside: Computers and peripherals change, bugs get fixed, and features get added, and when they do, drivers can go out of date. This means users need to ensure that they're using the latest and greatest drivers offered by the hardware manufacturers.

Once again, the Internet can make your life easier. Simply connect to the 'net, go to the manufacturer's Web site, and use the menu or search facility to locate the latest driver. It's free, quick, and simple. This is a far cry from the days when you had to call up the manufacturer's technical support department and get them to mail you a diskette with a driver on it. All in all, downloading drivers is an elegant solution to a vexing problem, unless it's your modem that's being difficult. Then, of course, you *can't* connect to the Internet, because it's a *modem* driver you need. Isn't irony great?

A typical example would be a user whose printer has stopped working, often right after installing a new piece of hardware or software. If the printer is a Hewlett-Packard, for instance, go to HP's Web site (http://www.hp.com/cposupport/eschome.html) and enter your printer model. Canon users can go to http://www.usa.canon.com /support/files.

Go to the Downloads And Drivers section and choose the appropriate driver. Click to download. Drivers are generally between 2MB (megabytes) and 4MB in size, so they can take a while to download, and then install the driver you just downloaded.

Sounds easy, yes?

There are even organizations, such as The Open Directory Project (http://dmoz.org/Computers/Hardware/Peripherals), Netscape's Peripherals (http://directory.netscape.com/Computers/Hardware/Peripherals), or DriverGuide.com (http://www.driverguide.com), that list drivers and other downloads for a variety of manufacturers and models. If you can't seem to find the correct driver, do a search and type **drivers** AND nnn, where "nnn" is the type, such as modem, printer, or scanner, of peripheral in question.

10. Clean Up The Windows Registry. The Windows Registry is a dangerous place, dark and forbidding and steeped in mystery. And for good reason. Let's start by saying that, although it is possible to directly access and edit the Registry, only an expert should attempt to do so. For the rest of us, there are tools that will, with varying degrees of effectiveness, modify and clean up the Registry for us.

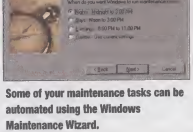
When a well-behaved application is installed, it "registers" itself with the Windows operating system. The result is a Registry database that holds configuration data about the hardware and environment of the PC in which it has been in-stalled. Many of the settings that in Windows 3.x were stored in the Win.ini and System.ini files are instead stored in the Registry in Win9x, WinNT, and Win2000.

Naturally, after installing multiple applications, the Windows Registry can become home to lots of important data. Any poorly considered meddling in the Registry files can result in application failures, operating system crashes, or boot-up failure. Don't mess with the Registry unless you know what you're doing.

All of that said, there are nonetheless times when we do indeed have to modify the Registry. For example, when you alter a setting in the Control Panel, that modification is normally reflected in the Registry. The difference is that the operating system is making that alteration for you, and the operating system, we presume, knows what it's doing.

There's one more instance during which the Registry can get damaged and require cleaning up, and this instance occurs all the time. If an uninstaller doesn't do a good job of removing all of the pieces of an application, and of updating the Registry to reflect that removal, or if a user simply deletes files and folders rather than running an appropriate uninstaller, the Registry can get bloated and out of date. Your computer may then slow down to a crawl as it attempts to locate files that are no longer present. That's why this is one of the most important of the "Don't" items in the accompanying sidebar: Avoid removing software by simply deleting files and folders. Whenever possible, you should instead run the application's uninstaller, or the Add/Remove Programs utility located in the Control Panel. Simply deleting files does nothing to remove their entries in the Registry, and you can't be sure that you're actually finding *all* of the files installed by the application.

There are several tools that will help you clean up the Registry. For example, Norton CleanSweep (from Symantec, http://www.symantec.com) does a good job of locating and deleting most of the orphaned Registry references left by already-removed applications. Such utilities examine the Registry to see what the Registry "thinks" is installed and then try to ensure that the application is present. If it's not, they can clean up the Registry to reflect the absence of those applications.



Some of your maintenance tasks can be automated using the Windows Maintenance Wizard.

■ Automating Maintenance Tasks.

Back when we were first discussing the list of 10 maintenance steps, we noted that Windows can automate many of these tasks for you, and we promised to show you how. It's now time to keep that promise.

Portable PCs also need routine maintenance.

If you click Start and then choose Programs, Accessories, System Tools, you'll see a Maintenance Wizard menu option. Selecting that option will bring up the wizard, which will let you schedule certain tasks for certain days and times. These tasks include defragmenting and scanning your hard drive, automatically deleting certain extraneous files, and setting up which programs should load during Startup. Once you've established a schedule, many of your maintenance tasks will be handled for you automatically.

■ **Where To From Here?** That's it: 10 steps to a well-maintained computer system. Not so bad, is it? If you can keep up with this maintenance schedule and pay attention to the Dos And Don'ts listed in the accompanying sidebar, you should have a well-tuned computer that will serve you well for years to come. LS

by Rod Scher

Here's what a dismantled keyboard looks like.

Trackballs are very easy to take apart, too.

Some Computer Maintenance Dos & Don'ts

Do	Don't
Regularly scan and defragment your hard drive.	
Use canned, compressed air to clean out keyboards and other computer parts.	*Use water or harsh cleaners, especially on monitor screens.*
Use the application's uninstaller (or Windows' Add/Remove Programs utility) to remove programs.	*Use Windows Explorer (or other such tools) to remove programs by deleting files and folders.*
Regularly clean up the contents of your /WINDOWS/TEMP folder.	*Shut down your computer until the system says that it's safe to do so.*
Check to be sure that you have up-to-date drivers.	
Use appropriate utilities to clean up the Registry.	*Edit the Registry yourself unless you're 100% sure that you know what you're doing.*
Use your virus checker and keep your virus definitions up to date.	
Use the spacers provided and make sure that any cards are inserted correctly and fastened securely.	*Leave spocers off or cards unfastened.*
Use Windows' Maintenance Wizard to schedule regular maintenonce tasks.	

Using This Info...

Keep this checklist in a logbook near your computer. Set a regular date, such as the 1st and the 15th of each month, to complete the checklist.

Computer Maintenance Checklist

Computer Make/Model: Date: By:

✓	Item:	Comments:
	Defrogment hord drive	
	Scan hard drive	
	Clean up /WINDOWS/TEMP folder	
	Delete unwanted files	
	Updote virus definitions	
	Clean monitor, keyboard, mouse	
	Clean out CPU case/chassis	
	Check to ensure cards are inserted firmly	
	Check for up-to-dote drivers	
	Clean up Windows Registry	

Remarks:

Add Storage Space To Your PC

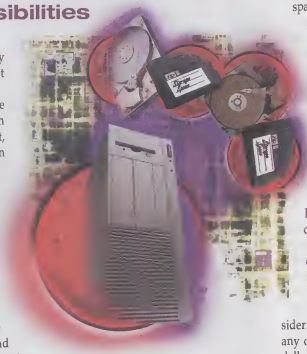
Increasing Capacity Expands Your Computer's Possibilities

Just as a home can't have too many closets, a personal computer can't have too much storage capacity.

Storage capacity determines the amount of data that your computer can keep on hand. Every program, document, spreadsheet, image, sound file, or screen saver that you keep on your computer fills up storage space the way shirts, skirts, and trousers fill a closet. In the case of your PC, the main closet is your hard drive.

The Internet has increased the demand for this digital closet space because every time you download a file or receive e-mail, more hard drive space is consumed. And the demand for storage space will be even greater as more people use their PCs to store, edit, and share photos and video that they created with digital cameras.

Adding storage capacity is one of the most common PC upgrades. Fortunately, the PC industry has responded to this demand by creating storage devices that have greater capacity and are easier to install and use. Plug-and-play hardware, USB (Universal Serial Bus) ports, and other innovations make it possible for virtually anyone to add a second hard drive or cartridge-based drive to store data.



And the list of options just keeps growing. You can record up to 650MB (megabytes) of data on a compact disc using a CD-R (recordable) drive. In addition, CD-RW drives not only let you write data to a CD but also erase the data and rewrite new data to the disc. With the latest innovation in optical storage, the DVD-RAM drive, users can write and rewrite data to DVDs, which have a capacity of 5.2GB (gigabytes).

And finally, there's the nonhardware option: online data storage services, which let you store data on their computers and retrieve it whenever you want via a modem or network connection.

The Usual Suspects. Which option is right for you depends on a number of factors. Think about how much additional storage space you need, whether you need immediate access to data, or if you are willing to take a few moments to insert a diskette or CD. Can you wait to download it from an online storage service? In addition, ask yourself if you plan to take the data with you and use it on several different computers. Finally, you have to be prepared to deal with physical limitations of your particular situation. How much clutter are you willing to deal with? Are you willing to open your PC and make changes? How old is your computer, and is it worth upgrading?

Below, we examine some of the most common options and their advantages and disadvantages.

Hard drives. Adding a second hard drive is the first option many people consider. Hard drives offer more capacity than any other kind of storage device at a lower dollar-per-megabyte rate. You can buy a 10GB drive for about $120 or a 20GB drive for about $200. Hard drives also record and retrieve data faster than any other kind of device, which you should consider if you're dealing with large graphic, animation, or video files.

The most common rap against adding a hard drive is the difficulty of installation. That's less of a problem with newer computers that have plug-and-play capabilities and/or USB ports. If you're dealing with an older PC, however, be prepared to do some homework before you attempt to install a new hard drive. For more information, see the "Installing An Internal IDE Hard Drive" sidebar.

Zip and Jaz drives. Probably the hottest storage device on today's market is the Iomega Zip drive. The original Zip drives could store up to 120MB of data on a special diskette. Newer Zip drives boost that capacity to 250MB and can still read and write to the older Zip disks.

Iomega's other popular storage drives are the Jaz, which can pack 1GB on a special disk, and the Jaz 2, which stores 2GB on a disk.

Key Points

- Adding storage capacity is one of the most common PC upgrades. Luckily, the industry has responded with larger capacity drives that are easier to install.
- If you don't want to pop the top off your computer, you can find a number of external storage device options, such as Iomega's Zip and Jaz drives.
- One of the newest ways to store data is through an online storage service. You'll have access to your data from any Internet-connected computer, but there are certain drawbacks.

Adding a cartridge-based storage drive, such as Iomega's Jaz drive, is an easy way to add a little extra storage space.

Additionally, Jaz drives can read and write to the lower-capacity Zip disks although Zip drives can't read and write to the higher-capacity Jaz disks.

Although the Zip and Jaz drives have great storage capacity, it's their ease-of-use that have made them such hot commodities. All you need to do is load some software on your computer, plug the drive into a port, and plug the power cable into the wall socket. In fact, Zip and Jaz drive users frequently transport their drives between the home and office.

Zip and Jaz drives are quite popular with graphic artists, who tend to work with extremely large files on Macintosh or iMac computers. If you intend to share desktop publishing files with a Mac user, a Zip or Jaz drive is an excellent option.

Zip and Jaz drives do have their drawbacks. Although their capacities are impressive, they are still dwarfed by the typical hard drive. And, it takes them longer than a hard drive to record and retrieve data.

"Super floppies." Other options worth considering are the so-called "super floppy" drives, such as the Imation SuperDisk or Sony HiFD drive. These drives can cram 120MB or 200MB, respectively, on to special diskettes that are the same physical dimensions as a standard 3.5-inch 1.44MB diskette. They also can read and write data to a 1.44MB diskette, which lets users remove their original diskette drives and replace them with super floppy drives.

Super floppies let you add a high-capacity storage device without filling up an extra drive bay inside your PC. One drawback to the super floppies is that they won't hold as much data as the newer Zip or Jaz drives. Plus, if your objective is to share data with other PCs, super floppy drives aren't as widely used.

CD-R drives. These drives offer several outstanding advantages for permanent data storage, beginning with their 650MB capacity. You also can record audio to these discs and play it on conventional compact disc players.

The price of CD-R drives has dropped dramatically since their introduction; you can find one for as little as $175 or less. The discs themselves are also inexpensive, costing $2.50 or less, depending on how many you buy. Moreover, CD-R provides a permanent record

Terms To Know

ATA (Advanced Technology Attachment)—Another term for IDE (Integrated Drive Electronics) technology.

CD-R (compact disc-recordable) drive—A drive that can read and write to a compact disc. However, once these discs are recorded, they cannot be erased and reused.

CD-RW (compact disc-rewriteable)—A drive that can record, erase, and rerecord data on a compact disc.

connector—A plug that fits into a socket on an adapter card or motherboard.

daisy chain—A set of peripherals connected together in a series. The first component connects to the computer, the second component connects to the first, and so on.

drive bay—The space in a PC reserved for the installation of any type of drive. These slots are usually located on the front panel of a computer.

drive controller—Circuitry that controls the transfer of data between a drive and the computer's motherboard.

DVD-RAM drive—A digital versatile disc drive that can read and record up to 5.2GB of data on a DVD.

FDISK—A DOS program used to partition a hard drive.

FireWire—Technology that lets a computer share data at a rate of up to 50MB per second with other devices, including drives and digital cameras. Also known as IEEE 1394.

mirrored drive—A drive that contains a backup copy of data that is primarily found on another drive.

partition—A reserved portion of disk or memory that functions as a separate unit; when used as a verb, partition refers to the process of dividing up the space on a disk into smaller units.

port—A device, which resembles a plug-in, that is found on the back of a PC. It allows access in and out of the computer for cables. Ports can be used to connect all types of devices.

SCSI (Small Computer System Interface)—An interface technology that lets computers share data with drives and other devices at rates of up to 160MB per second. As many as seven SCSI devices can be connected together to form a daisy chain and share the same port

transfer rate—The maximum rate at which a device can transfer data to another device.

USB (Universal Serial Bus)—An interface technology that lets computers share data with drives and other devices at rates of 1.5 megabytes per second. As many as 127 USB devices can be daisy chained to share the same port. The computer automatically recognizes any USB device as soon as it's plugged in or added to the chain.

of the data, which is a valuable asset if you want to archive important information. Of course, that is also the principle drawback of CD-R: Once data is recorded to disc, you can't alter or update it.

CD-RW drives. The CD-RW drive improves on CD-R by letting users erase and rewrite information to special rewriteable discs, which cost about $20 each. A CD-RW drive also can read data from and write to a CD-R disc or read data from a conventional CD-ROM.

The principle drawback to CD-RW drives is their speed, particularly when rewriting a disc. They also are more expensive than CD-R drives, running anywhere from $230 to $500.

DVD-RAM drives. For the ultimate in removable data storage, consider the new DVD-RAM drives, which are capable of storing as much as 5.2GB of data on a DVD. This is an ideal option for people who want to archive digital video.

DVD-RAM drives are, of course, about the most expensive storage device on the market, starting at about $500. The recordable DVDs themselves cost about $20 each. Moreover, the technology is still new, so standards are still evolving; the DVD you record on your drive may not necessarily run on another drive.

Drive Interfaces

If you're shopping for a new storage drive, all kinds of acronyms and numbers are going to be thrown at you that deal with the devices transfer speed. Below, we list the most common drive interfaces on the market and their maximum data transfer rates in megabytes per second.

Drive Interface	Internal/External	Transfer Rate (MBps)
ATA/IDE	Internal	3.33
Fast ATA/EIDE	Internal	4 to 16.6
ATA2	Internal	16.6
Ultra ATA/33	Internal	33
Ultra ATA/66	Internal	66
Parallel Port	External	1.5
USB Port	External	1.5
SCSI	External	5
Fast Wide SCSI	External	20
Ultra SCSI (also known as Fast 20 & UltraFast SCSI)	External	20
Ultra2 SCSI	External	40-80
Ultra160 SCSI	External	160
FireWire (IEEE 1394)	External	12.5, 25, or 50

■ **Internal Or External?** Virtually all these drives are available as internal devices, which you have to install inside your computer's case, or as external devices that plug into one of your computer's external ports. Both types offer advantages and disadvantages.

An internal drive can connect directly to the motherboard of newer computers. If you have an older computer with a hard drive interface card, you can easily connect the new internal drive to it. Either way, you're assured of peak performance transferring information to and from the drive. Internal drives are also cheaper than their external counterparts.

However, if the thought of digging around inside of your computer makes you squeamish, consider an external drive, particularly if your machine has a USB port. Even if you don't, you can find an external drive that will connect to your computer's parallel port. One of the best advantages of an external drive is that you can move it from computer to computer, creating a handy way to move large amounts of data from one PC to another.

Of course, external drives add to the clutter at your workstation. Moreover, they require their own electrical cords, adding to the snake's nest of cables behind your PC.

In addition, if your external drive connects to a parallel port, it will transfer data much slower between the PC and the drive. You could add a USB or SCSI (Small Computer System Interface) port to your PC, but that takes us right back to where we started: fiddling around inside the computer.

■ **Driveless Storage.** If you need only a little extra storage space, consider using an online storage service, which lets you send data over the Internet and store it on one of the service's hard drives. A number of services offer anywhere from 20MB to 300MB of space, and many of them are free.

Of course, there are advantages and disadvantages to online storage services. On the plus side, you can access the data from any computer with a modem and an Internet account, whether you are at home, work, or school. In addition, you can give other users access to the files, which makes these services a nifty way to share family photos, music files, or collaborative documents.

Unfortunately, online storage services are not terribly convenient. Not only do you have to wait while your modem dials up and logs on to the Internet, but you'll also have to wait while the file is downloaded to your PC. On top of that, 20MB to 300MB isn't a lot of space.

■ **Choosing A Drive.** Now that we've outlined your storage options, we'll help you decide which type of drive is right for you. We'll start with the physical drives that you'll have to add to your computer system and discuss online storage options later on.

A number of factors can affect your choice of a drive, but the first two to consider are your computer's **BIOS (Basic Input/Output System**; a special piece of software built into computers that controls the startup process of you system and other basic functions) and operating system.

The BIOS will determine the maximum capacity of storage devices that your computer can use. Unless you intend to upgrade a particularly old computer, the BIOS shouldn't limit your choices. If you're trying to upgrade an old 386 or early 486, however, you better check your owners manual. Even then, you may be able to update the BIOS to work with larger storage devices.

Some DOS versions and early versions of Windows 95 will limit storage capacity to 2.1GB per disk. Even so, this is not such much a barrier as an obstacle because you can overcome it by partitioning your drive into "logical" drives of 2.1GB or less. You can do this through FDISK, which is a DOS utility used to partition hard drives, or through a third-party utility, such as PowerQuest's PartitionMagic.

Drive interfaces. The next factor to consider is the drive interface, which connects your drive to the computer's motherboard. You can connect a new drive to your computer's existing drive interface inside your PC or

to a USB port, parallel port, or SCSI port on the outside of your PC.

Unless you own a particularly old PC, the existing drive interface inside the PC will be an IDE (Integrated Drive Electronics; also known as ATA [Advanced Technology Attachment]) or EIDE (Enhanced IDE; also known as Fast ATA). Unlike older hard drives that required a separate disk controller to manage the flow of data from the drive to the motherboard, IDE/EIDE/ATA drives have built-in controllers.

IDE-type drives and their derivatives use a flat ribbon cable that plugs into the drive on one end and the motherboard (or a special expansion card) on the other end. The original ATA drives transferred data from the drive to the motherboard (and vice versa) at a rate of 3.33MBps (megabytes per second). Fast ATA boosted the rate to 4 to 16.6MBps, ATA-2 to 16.6MBps, Ultra ATA/33 to 33MBps, and Ultra ATA/66 to 66MBps. Check out our chart to see a rundown of available interfaces and their speeds.

The actual speed at which the drives transfer data can be limited by a number of things. For example, the Ultra ATA/33 and UltraATA/66 will operate at maximum speed only if your computer has a PCI (Peripheral Component Interconnect) motherboard capable of transferring data in 32-bit chunks.

Every PC comes equipped with at least one parallel port and some external hard drives are designed to work with them. The drawback is their pokey 1.5MBps transfer rate.

Virtually every new PC features a USB connector on the outside of the case. USB-equipped computers meet the plug-and-play standard, which means you can attach a USB-compatible hard drive, scanner, keyboard, or other device simply by plugging it in. Moreover, as many as 127 USB devices can be plugged into one another in a daisy chain. Like the parallel interface, USB transfers data at 1.5MBps, but the bigger advantage of USB is its ease-of-use and versatility.

If you don't have a USB port, you can purchase a USB expansion card and install it in a free slot on your computer's motherboard. (For all expansion card installations, refer to the manufacturer's instructions.) For less than $50, you can add two USB ports to the back of your PC. However, to get plug-and-play capabilities, you may need to upgrade your computer's BIOS.

Few IBM-compatible PCs come equipped with SCSI ports, but you also can add these by installing an expansion card. Like USB devices, SCSI devices also can be daisy chained, but SCSI will only handle seven devices at a time. Depending on the type of SCSI card you install, you can get transfer rates of 5MBps to 40MBps for less than $100.

One of the newest interfaces on the market is FireWire (also known as IEEE 1394), which is a fast interface that is compatible with the data ports on digital cameras and digital video cameras. A few, select PCs designed for "multimedia" use will feature a FireWire port. In most

Installing An Internal IDE Hard Drive

The advent of plug-and-play technology has simplified the process of installing new hardware on your computer. Here, we offer some general hard drive installation instructions, but if the manufacturer's instructions differ in any way, go with what's included with the drive.

Turn off your computer, unplug it, and ground yourself (touch something metal) to discharge any static electricity that you may have built up. Remove the computer case and look for an open drive bay where you can install the new hard drive. Find the ribbon cable that connects the drive to the IDE socket on the motherboard. In most cases, the cable should have three connectors: one attached to the motherboard socket, one attached to the hard drive, and one that is unused.

Read the drive's manual to learn how to configure it as either a master or a slave drive. With an IDE drive, a single ribbon cable can be used to connect to two drives. One of those drives has to be the master while the other is the slave. If you're attaching the new drive to the same cable as the existing hard drive, you'll need to configure it to work as the slave with the existing hard drive being the master.

Slip the new hard drive, with rails attached if necessary, into the drive bay and fasten it in place using the screws that came with the drive. Next, you need to make the connection. Find the hard drive connector; it will have a low number (such as 2) on one side and a high number (such as 34) on the other. Plug the ribbon cable into the connector, making sure the colored edge of the cable matches up to the low-numbered end of the hard drive connector.

Your new hard drive is now ready for electricity. Find an unused power lead (four wires that fit into a single plug) on your computer's power supply and plug it into the power socket on your new hard drive. If you can't get it to fit, you may need to buy an adapter. Under no circumstances should you try to force it to fit or "modify" it.

Reattach any cables that you may have removed during the installation process. Without replacing the cover, plug in the computer and turn it on. If you've done everything right, your computer should turn on and boot up as usual. Now you can turn it off and replace the cover.

You're not done yet. Now you'll need to partition and format the new hard drive. Partitioning names the drive and lets the computer view it as either a single physical drive or as several logical drives. For example, you could partition a 10GB hard drive as a single 10GB physical drive E: or partition it into four 2.5GB logical drives E:, F:, G:, and H:.

You can partition your new drive with DOS' FDISK program. In Windows 95 or Windows 98 (collectively, Win9x), open an MS-DOS window and, at the C> prompt, type **FDISK** and press ENTER. Type **Y** when FDISK asks if you want to enable large disk support and press ENTER. In the next window that appears, choose the Create DOS Partition Or Logical DOS Drive option and follow the instructions.

To format the new drive in Win9x, double-click the My Computer icon and right-click the drive that you want to format. Select Format from the pop-up menu and follow the instructions.

The steps for installing an internal IDE hard drive are similar to the steps for installing any other internal IDE drive, including diskette drives, CD-ROM drives, and more. □

cases, though, you'll need to install a FireWire expansion card, which you can pick up for about $99.

Choosing An Online Storage Service.

Finding an online storage service isn't difficult, but choosing among them is.

Some of the best-known services include @Backup (http://www.atbackup.com), MySpace.com (http://www.freediskspace.com), BackupMyStuff.com (http://www.backupmystuff.com), Punch WebGroup (http://www.thekangroo.com), i-drive.com (http://www.idrive.com), and Driveway (http://www.drivewaycom). You can find plenty of other options on the Internet by using a search engine to look for "online storage" or "online backup."

The basic cost of services varies, depending on both the amount of storage space you use and the types of services offered. MySpace.com offers 300MB of free space and lets you earn additional storage space by referring other users to the service. Driveway starts out with 25MB of free space, but users can buy more space, as well as earn an additional 70MB for completing a survey and referring friends. Be sure to carefully read each site for the exact usage terms and benefits.

Keep in mind that nothing is truly free. These and other online storage services cover their costs and earn their profits by amassing data about you and sending you e-mail that advertises products and services.

On the other hand, @Backup charges $99 a year for 100MB of space, and BackupMyStuff charges $6.45 a month for 100MB. However, @Backup and BackupMyStuff offer features that are unavailable from the free services. For one thing, both let you automatically back up your files at times when you're not using your PC. When backing up a file you've just modified, these services save only the changes. This is a neat trick that cuts down on backup time and reduces the storage space required to back up a file. Finally, they save multiple versions of your files so you can go back and compare the most recent version to earlier versions.

Virtually all online storage services let you access your account from multiple computers or share your online files with other Internet users. With i-drive, for example, you can send friends, families, and co-workers an Internet link to a file you want them to see.

Other services let you issue additional passwords with varying levels of access to your online storage account. You could, for instance, issue a "read-only" password to someone with whom you wanted to share a document, or an "all-rights" password to your spouse or business partner.

MY SPACE
REFER YOUR FRIENDS AND GET UNLIMITED SPACE FREE!!!
YOUR FREE DISK SPACE
300 MB Free Virtual Hard Drive
Private and secure
Share your files
Collaborate on files
24/7 access
300Megs
Upload Files
Affiliates: Earn $1.25 per user with our new program. Join now!
Click here
WebClipper
Clip and save files from anywhere on the Web to your MySpace using our new WebClipper! Tell me more.
DragnDrop
Drag and drop files directly from your desktop to your MySpace account. Tell me more.
Tell us your story
If you have an interesting story about how MySpace has helped you to better organize and access your information, we'd like to hear about it! Click here
Upgrade your disk space
MAC SPACE
PDA SPACE
LINUXSPACE
PC SPACE
MP3 SPACE

MySpace.com starts you out with a free 300MB of online storage space and lets you earn more by referring others to the service.

Getting down to business. Many services are designed primarily for home PC users while others, such as BackupMyStuff and PunchWebGroup, were designed with business users in mind. BackupMyStuff, for example, is the single-user version of the Connected Online Backup corporate online storage service.

Punch WebGroup offers a nifty feature that lets you organize your online files into separate "groups" for your personal files and shared files. You can create different groups for different projects, letting people read, modify, and archive multiple versions of files online. PunchWebGroup offers 10MB of space and two groups for free, but lets users lease up to 100MB of space and 10 groups for $99 a year.

In some instances, you'll need to download and install special software to access online storage services or take advantage of certain features. If backing up and protecting your files is your principle concern, many online services will create an unerasable CD-ROM of your data and ship it to you for prices starting at $24.95, plus shipping and handling.

Safe storage. The security of all online storage services is good, but some sites have better security than others. All online storage services are password protected and nearly all use some form of software encryption to prevent hackers from breaking in and viewing your business plans and baseball card inventory. Others go the extra step of using SSL (Secure Sockets Layers) to encrypt the data while it is being sent over the Internet and digital certificates to verify the identity of the sender.

But what happens if the online storage service's hard drive crashes? Many online storage services go to great lengths to let potential customers know they have their own backup system. In most cases, this is a second facility where all the data on its Internet-accessible hard drives is copied, or "mirrored," on hard drives that are isolated from the Internet. If the online storage service you're investigating doesn't mention this feature, make certain to ask about it before committing your data to its care.

More In Store.

The best way to determine how much storage you need is to look at how much free drive space you've used since you purchased your PC. If it looks like you'll run out of space before you buy a new computer, you'll definitely want to make some kind of storage upgrade.

Adding an internal drive can be one of the more challenging upgrades you attempt, so adding external drives can be an easier option if you don't mind giving up a little desk space or enduring a bit more cable clutter. Relying on an online storage service can let you use your data on any computer with an Internet connection. Whichever option you pursue, the bottom line is that it's better to have space and not need it than need it and not have it. LS

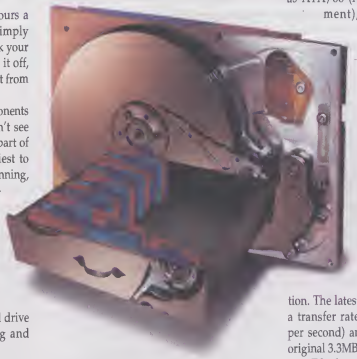
by J.W. Huttig

Organize Your Hard Drive

Use These Tips & Tools To Make Your Drive Perform At Its Best

Whether you spend countless hours a day in front of your PC or simply start it up once in awhile, check your e-mail or perform a quick task, and shut it off, chances are your hard drive could benefit from a little better organization.

The hard drive is one of those components that users often ignore because they can't see it. Yet it is possibly the most important part of a PC, and it's certainly one of the easiest to customize and tweak. With careful planning, you can organize your hard drive, making it faster and easier to find the important information you need.



Understanding how a hard drive works and fits into your system will help you add a second drive or transfer data to a larger drive if you decide to upgrade. Most important, you can get more available space from your hard drive with little or no cost by compressing and archiving infrequently used data.

The following pages will show how you can organize your hard drive and make it perform at its best. You can make many improvements using tools that come with a new hard drive or Windows or are available to download from the Internet for free or for a small registration fee. Using some or all of the methods listed here will improve the data transfer speed in your system and increase the amount of space available for storage without buying a larger or second hard drive.

Key Points

- Organizing a drive lets you make better use of the available storage space.
- To keep your drive in top condition, be sure to regularly defragment, partition, and compress it.
- File naming and storing tips can boost your productivity.

■ **Hard Drives At Work.** To understand how to manipulate files to improve space and performance, it helps to know how a drive stores data. We could go right down to cylinders, heads, tracks, and sectors that make up the mechanics, but for our purposes, it is unnecessary to know those details. (If you want to increase your knowledge of the physical makeup of a hard drive, visit http://www.smartcomputing.com.)

There are hard drives that can hold up to 75GB (gigabytes; 1GB is equal to 1,024MB [megabytes] or 1,073,741,824 bytes) or more. The likelihood is that your hard drive is somewhere between 4.3GB and 37GB. Whatever size, sooner or later, if you don't take care of your drive by deleting unused files and programs or organizing the data it contains, it will become full. With careful planning and the use of a few tools, you can increase the available space and prolong the life of your drive.

Hard drives continue to become cheaper for the amount of space you need or want. So if you have an older, smaller drive, an upgrade may be wise, especially with other improvements in technology, such as ATA/66 (Advanced Technology Attachment), Ultra-Wide SCSI (Small Computer System Interface), and faster spin speeds to increase data flow. (We'll explain those terms and others as we go along.)

Most home computers support one or two drives and have hard drives that use the IDE (Integrated Drive Electronics) interface. Pentium systems and above can usually handle up to four devices, including CD-ROM, DVD, Zip, and tape backup drives. IDE is also known as ATA, which has had some revisions since its introduction. The latest version is ATA/66, which has a transfer rate of up to 66MBps (megabytes per second) and is an improvement over the original 3.3MBps.

IDE had a storage limit of 528MB. No matter how big the hard drive, the system would not see anything larger than that. The Enhanced IDE format, EIDE, stretched that to a limit of 8.4GB. This is better, but still not enough for today's drives. Now, with the latest incarnations of Ultra ATA and ATA/66, there are no restrictions on size, so these standards can handle much larger drives.

Some PCs may have a SCSI (pronounced scuzzy) connection. This more expensive option lets you daisy chain up to eight devices to one connection. SCSI and IDE interfaces are not interchangeable, and a device designed for one will not work on the other. You can add a SCSI interface card to an IDE system (or vice versa) to add more drives, although doing so could cause a small risk of instability in the system. SCSI devices have an ID number called the LUN (Logical Unit Number), which has to be set to a code not used by other devices. The controller

The information panel on the left shows that drive C: has a capacity of 27.9GB (gigabytes). We've used 8.6GB, so 19.3GB are available.

usually uses one of the LUNs, reducing the number of devices to seven.

Start With FDISK.

Now that you know the basics of hard drives, we'll get into taking care of them. The first item we'll cover is preparing a drive for formatting. Keep in mind formatting erases all data on a drive, so you'll only need to do it in special cases where you're having extreme drive problems or if you installed a drive that didn't come formatted from the manufacturer.

Before you can format a disk, you need to run a small DOS utility called FDISK. This fixed disk setup program creates partitions and logical DOS drives, and you need to run it if you'll use your hard drive on a Windows system. Other operating systems have their own version of FDISK, so read the documentation before you attempt to format a disk for Linux, Unix, OS/2, BeOS, or any other OS (operating system).

You'll find FDISK on the Windows 95/98 (Win9x) boot diskette that came with your system or on the diskette you created when you installed Windows. If you don't have this diskette, open Control Panel, select Add/Remove Programs and choose the Startup Disk tab. Click Create Disk to create a bootable diskette with FDISK and other formatting tools.

WARNING: It is easy to make your hard drive unreadable using FDISK. Make sure you have backed up all of your data before you open this program and be sure you know what you are doing before saying Yes to any option. If you have any doubts, leave the program alone and contact a computer expert.

To use the program, boot the computer with the Windows Startup disk in the A: drive. Type FDISK at the prompt, and the program should load and run.

The first option is to add large disk support, or FAT32 (32-bit file allocation table). Then, there is a series of numbered options depending on what you need to do. If you have just one hard drive, there are four options. A fifth lets you select the volume (or drive) you want to work on. The last option displays all partition information as it exists now. You can create or delete a partition and set the active partition (boot diskette) from this menu. Once again, this is a powerful tool, and you could lose all of your data if you do not use it correctly. There is little documentation on its operation, but one Web resource that may help is FDISK.COM (http://www.fdisk.com).

Use ScanDisk.

ScanDisk is different from FDISK but it is just as useful a tool when checking for problems or installing a new hard drive. The program can check the hard drive for errors and warn you if any area of the drive contains bad sectors that may damage any stored data. Think of it as an inspection that shows a damp area in your closet and stops you from placing your favorite sweater in that area.

ScanDisk performs a check on all the files on the disk. When you select Thorough, it will check the physical surface of the disk and report problems. You should periodically perform the Surface Scan but not every time you run the main program. It is unlikely that bad sectors will suddenly appear, and the Surface Scan takes a long time to run. Let ScanDisk give your disk a thorough workout once every couple of months to be safe. You have the option to save any misreported files so you can examine them later.

Keep in mind that when you shut down your computer, files write to the hard drive. If for any reason you don't shut down properly, Windows will run ScanDisk automatically because there is a chance that files were damaged.

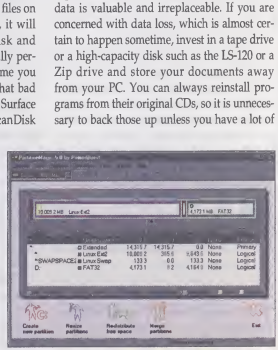
To run ScanDisk from a DOS prompt, go to the prompt and type scandisk. Or you can run ScanDisk from Windows. Go to Start, Programs, Accessories, System Tools, ScanDisk to start the program. All you need to do is choose the drive you wish to scan and select a Standard or Thorough test. Check the box to have the program fix errors automatically and then click Start.

Format A Drive.

Once you've run FDISK or ScanDisk, you can move on to formatting your drive, if desired. To understand formatting, compare your hard drive to a large closet. If you put all your clothes in the empty closet, everything would have to be piled on the floor, making it difficult to find what you want and increasing the chances of damage to each item. Add shelves and a rod, and your task is easier. The size of the shelves is also important. If they're too big, you can't store much without having to search extensively to find what you need. Too small, and it takes a long time to place everything, and you have to split sets.

Formatting is the computerized way of adding shelves of a suitable size to your hard drive. The computer stores the location of the files in the FAT (file allocation table), which is like the index in a book. It tells the computer where to go to get what the system needs. If the FAT becomes corrupt for any reason, then the disk is almost useless.

There are independent companies that specialize in data recovery, but those are generally expensive and not recommended unless the data is valuable and irreplaceable. If you are concerned with data loss, which is almost certain to happen sometime, invest in a tape drive or a high-capacity disk such as the LS-120 or a Zip drive and store your documents away from your PC. You can always reinstall programs from their original CDs, so it is unnecessary to back those up unless you have a lot of



We've partitioned this 15GB (gigabyte) drive using Partition Magic. We devoted about 10GB to Linux, and the rest is available for Windows.

backup space available or wish to retain settings.

Keep in mind the manufacturer will have formatted your hard drive so there is no need to format your existing disk unless you are reinstalling your OS and programs. If you buy a second disk or replace your main drive, you will need to format it.

Formatting takes two forms, depending on whether you are configuring your main drive or adding a second one. To add a second drive, you can use Windows to format the second drive. It is important to remember that if you add a drive to your system using FDISK, it will take the next drive letter after the other hard drives and not the next one after your CD-ROM or DVD drive. This means that if you start with one hard disk (drive C:) and a CD drive (drive D:), the second hard drive will take drive letter D:, and the CD-ROM will become drive E:. This may have an impact on any installed programs that refer to the CD-ROM drive, for example, so, after upgrading, you may need to reinstall any software that will not run.

From the Add/Remove Programs Properties dialog box, you can create a boot (or startup) diskette, which we recommend (especially if you are altering your system).

Open My Computer by double-clicking it. Right-click the new drive (usually drive D:, but double-check before you proceed). Select Format from the context menu and look at the options presented in the Format dialog box. You can choose the type of formatting you want. If the drive is clean, a Quick format will erase the FAT without touching the data. The data will not be easily accessible without special tools, and you can use the drive as new.

If the drive is new or you want to ensure that you can't recover the files, then a full format is

Terms To Know

archive—A compressed file containing data. An archive is used for sending files by e-mail or storing less-needed files to save hard drive space.

ATA (Advanced Technology Attachment)—This method of connecting a hard drive to a computer is also known as IDE (Integrated Drive Electronics) and supports up to two devices. Modifications and updates to the original specifications include ATA-2 or EIDE (Enhanced IDE), Ultra-ATA, and ATA/66.

backup—A copy of a file or files created in case the original is destroyed or damaged. This can be in a different directory or on a tape drive, CD, or diskette.

cache—An area of memory devoted to storing commonly used data to speed up transfer. On a hard drive, it is also used as a buffer between the computer and the drive to store information while it is being written.

Defrag—Short for Defragment. The name of a program designed to rejoin split files on a hard drive. Some programs will also organize the data to make more commonly used files faster to access by placing them at the beginning of the disk. See **fragmentation**.

directory—An organized catalog of files and subdirectories contained on a hard drive or a removable disk. The main directory is called the root directory; all subdirectories stem from it.

EIDE (Enhanced IDE)—This is an update to the original IDE specification that improved the transfer of data between the hard drive and the computer.

extension—The three characters after the period in a file name. This is what identifies the file to Windows and, if an associated program is registered, launches the application. For example, a .DOC extension may launch Microsoft Word or WordPad to read or edit the file.

FAT (file allocation table)—The method Microsoft DOS (MS-DOS) uses to keep track of the contents of a disk. The table is a chart of numbers that correspond to cluster addresses on the disk. FAT16 and FAT32 are the file formatting systems used by Windows.

folder—A directory holding similar files together. See **directory**.

format—To prepare a blank diskette or hard drive to hold data. This erases all data on a disk.

fragmentation—When files are split and spread around a hard drive, they are fragmented. See **Defrag**.

hidden file—Files that do not appear when users view a list of files using the DOS DIR, COPY, and DELETE commands. Usually, they are system files that could cause the operating system to malfunction if they are changed or removed.

IDE (Integrated Drive Electronics)—The most common standard for connecting hard drives and other devices to a PC.

NTFS (NT File System)—A file organizational system by which data is stored and accessed in a Windows NT operating system. NTFS offers better methods of data protection and file recovery than a FAT, the file system of DOS, Windows 3.x, and Window 95/98. It also supports long file names.

partition—A reserved portion of disk or memory that functions as a separate unit; when used as a verb, partition refers to the process of dividing up the space on a disk into smaller units. A partition acts as a separate space, but physically it is still part of the whole disk.

root directory—This is the first directory you encounter on a hard drive. Every other folder is a subdirectory of the root. System files are in the root of the C: drive.

SCSI (Small Computer System Interface)—This is an alternative to IDE; it transfers data at up to 80MBps (megabytes per second).

slower, but more thorough. If you want to boot from that drive by changing it to the master or using a dual boot system, you will need to copy the system files to the new disk. This option lets you do that without formatting. Other options include adding a label or name to the disk and copying the system files to the new drive after formatting is complete. You can display a summary of the operation if you want to see what the formatting did.

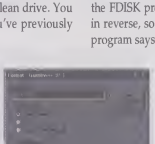
If you have only one hard drive and want to format it, you have to boot the computer from the diskette supplied with Windows and format from the DOS prompt. Before you remove any files from your original Windows diskette, open the diskette and make sure that Format.exe is on the Windows boot diskette. If you need to create a boot diskette, go to Control Panel, double-click Add/Remove Programs, and choose the Startup Disk tab. Insert a blank formatted diskette, click Create Disk, and follow the instructions on the screen.

Once Format.exe is on the boot diskette, from the DOS prompt, type the command:

Format c: /s /q

The switch /s copies the system files to the formatted disk, enabling you to boot to DOS and start your new Windows installation. The /q switch speeds things by clearing the FAT, effectively leaving you with a clean drive. You can use this option only if you've previously formatted the drive.

You will get a couple of warnings that you are about to erase all the data on your hard drive, so you get the chance to back out before making a mistake. Double-check what you are doing at every step to be extra safe and not leave yourself with an inoperable system. Make sure you have the disks you need to restore your system and that you have all the add-on files and serial numbers. If you have shareware or other software that you have downloaded from the Internet, be sure you have it on a backup disk or tape and can reinstall it easily (along with any registration codes that may be in an e-mail).



When formatting a drive, the Quick option is only available if you've previously formatted the drive.

■ **Partitioning.** Dividing your hard drive into smaller drives, or partitions, lets you run different OSes on the same machine. For example, you need a different format to run Linux than that needed for Windows. Windows NT has its own file system, too, and cannot even see a drive that is formatted using the Win9x FAT32 format. Another reason to partition a drive is for organization. Your drive sees each partition as a separate drive. So you could have one partition for games, one for utilities, another for graphics, yet another for data, and one for backup files. You lose storage space when you partition a disk, so don't make the drives so small that they eat all of the available storage or restrict the size of files you can save.

This latest drive from Quantum has a capacity of up to 30GB (gigabytes), uses the ATA/66 standard, and spins at 7,200rpm (revolutions per minute), making it large, fast, and quiet.

You can partition your hard drive when you format it using the FDISK program. Also, formatting programs supplied with other OSes include their own partitioning software. OSes will work with a DOS format administered by the FDISK program. That may not be the case in reverse, so use this in preference unless the program says that it is compatible.

Generally, partitioning takes place only when you format the drive. Commercial programs such as Partition Magic ($69.95; http://www.powerquest.com) let you add a partition to an existing drive (provided there is space) without compromising data already on it. The program also includes Boot Magic, which lets you choose which OS you want to run at startup and lets you convert from one format to another without losing data.

■ **Organize Your Drive.** Now that we've shown you how to format a drive and create different partitions, we'll give you some tips for making better use of the drive.

If you throw everything into your closet, it takes a long time to find your favorite shirt when you need it. In the same way, a disorganized hard drive makes finding files more difficult. By spending a little time organizing your hard drive, searching for programs and other files becomes a lot easier. That task is hampered because some software has default settings to store data and you need to change those settings if you want to keep things neat.

Most programs will give you the option of where to install them during the setup procedure. You can enter a path and keep all of your programs in the same place. The usual place is in the PROGRAM FILES folder on the C: drive. Keeping all of your programs here has the advantage of knowing where to look if you have a problem. Creating other folders for similar program genres also helps to find things when you need to. Sometimes using Add/Remove Programs to delete software that is no longer required leaves folders and some files behind. If you know where to look, you can get to these files quickly and easily and make sure they are removed, rather than tying up valuable disk space.

Creating a folder is simply a matter of right-clicking with the mouse in the right window of Windows Explorer or in the open drive and selecting New, and Folder. The folder appears with the name, New Folder, highlighted so you can change it to whatever you want. If you happen to use a character that Windows doesn't allow, such as a slash or other symbol (\ / : * ? " < > |), the system will tell you and force you to you change the name. You can "nest" folders within each other to create subfolders, which further helps in keeping your data together. You may have a folder called GAMES and within it have each game in a separate folder, for example. Or you may keep all of your graphics programs together in the same way.

Once you install a program, do not move it by dragging the folder into another one. The nesting mentioned above must take place at the time of installation, otherwise your system may not find the program, and you will get error messages.

■ **Naming Conventions.** You can name your files anything you want to with a few exceptions. There are certain characters you cannot use (see above), but you can use plain English if you are working with Win9x or WinNT 4.0.

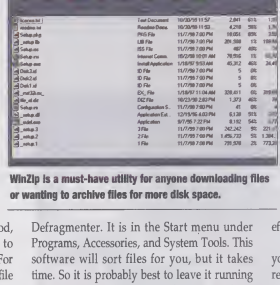
In Win9x you can even use long file names (the DOS and Windows prior to 9x were limited to eight characters, plus a three-character extension, without spaces). Keep in mind if you use an earlier version of any program, this program may shorten the file name. But for most applications, it should be fine.

All files have an extension after the period, which identifies the file type (if known) to Windows and associates a program with it. For example, you can name a Microsoft Word file My Letter.doc where the .DOC is associated with the program. Consequently, by double-clicking the data file, in most cases Microsoft Word automatically opens. This is handy because it means you don't always have to find the program, launch it, and then find the data file again to edit it. You can also find recently used files in the Documents option on the Start menu, again by clicking the file, and open it in the correct software.

When thinking of names for your files, be descriptive so you can find them later. Don't be tempted to use similar names (for example Data1, Data2, and so on) as this will lead to confusion and frustration later when you are looking for something specific. You might even want to consider putting a date in your file name, for easy tracking.

■ **Fragmentation.** When you start saving multiple files and applications to your drive, files become fragmented. For example, when you store a file on your hard drive, it fills the next available space in order. If the file is larger than that space, the drive stores as much as it can in that space and then puts the rest in the next available position, and so on. The spaces are unavoidable; they're created whenever you modify or delete files in the day-to-day operation of the drive.

You can improve the performance of your drive by sorting the files so they are whole again, which means your system can read them quicker than if they were spread throughout the drive. To do that, run a program included in Windows called Disk Defragmenter. It is in the Start menu under Programs, Accessories, and System Tools. This software will sort files for you, but it takes time. So it is probably best to leave it running when you go to bed or are doing something else. You can't use your PC while it is performing its magic.



WinZip is a must-have utility for anyone downloading files or wanting to archive files for more disk space.

To use the program, launch it and select the drive you wish to defragment. You can choose whether you want the programs rearranged so that they start quicker and also whether to check the drive for errors. Performing a ScanDisk operation prior to starting this program will eliminate the need to check for errors and speed up the process slightly. The program will then work automatically. You can view the procedure by clicking the Show Details button or just leave the small window. Before you start this process, it is best to disable your screen saver and leave the machine alone as it will take longer if you don't.

■ **Compression.** If your drive is reaching capacity, one way to save space is to compress programs and data files that you don't need all the time. You can compare this to folding your clothes to put them in a drawer. To use them, all you need to do is unfold them, and you can wear them.

If you have space on your hard drive, why would you use compression? Well, Windows uses part of your drive as virtual memory. That is an area set aside for large files and other processes that won't fit into physical memory. If you have little or no space on the drive, virtual memory is severely limited. So you need to make sure you have a good amount of space available. If you keep at least as much disk space free as the RAM (random-access memory) in your PC, you should be covered for most applications. But more is better.

Compressing files will store them in less space and you can still reach them whenever you need them. If you are backing up your data onto removable media (tape, Zip, LS-120 disk, or other such media), you can store far more and in less time if it is compressed. Some files, such as executable programs, are well packed and will not reduce much when compressed. But some picture files, such as TIFF (Tagged Image File Format) images, will pack into a tiny space. Unlike tightly packing your clothes, when you restore a compressed file, there are no obvious signs (no wrinkles) and no adverse effects.

Probably the best program for compressing your files is WinZip (free trial version, $29 to register; http://www.winzip.com). This program will do all of the hard work for you and store your files in a much smaller space than normal. It also keeps them together in one archive, and you can restore files individually without having to bring them all to full size. We would advise you to keep the Zip file relatively small—no bigger than about 10MB—or things slow down when opening to search and restore.

■ **Remove Unwanted Files.** One last tip to keep your drive in good working condition is to delete unneeded files. Windows software has a habit of depositing files on your hard drive that you may no longer need. The largest space waster is probably the temporary file.

You can remove these files safely by clicking the Start menu and then Find followed by Files Or Folders. In the Named: section, type ***.tmp** and then highlight and delete whatever is found. Make sure you search the whole drive by putting the drive letter in the Look In: section and checking Include Subfolders. Other files also may be safe to delete. Open the hard drive and look in the WINDOWS/TEMP folder. Anything deposited here should be safe to remove. If you want to double check before deleting these files, move them into the Recycle Bin and leave them there for a day or two to be sure your system doesn't need them. LS

by Tony Kaye

Install A Home Network

Basic Steps For Putting Your PCs In Touch

If you're installing a home network for the first time, you might not be sure of what's needed or what parts work together. You could spend time puzzling over a computer catalog, trying to assemble the required parts. At least you know you'll need some kind of network interface card for each computer in the home, a physical way to link these cards together, and software to let your networked computers communicate. Detailed instructions would be nice, as well.

Fortunately, manufacturers offer home networking kits that have everything you need to network at least two computers, including easy-to-understand instructions. To hook more computers up, you simply buy more network interface cards, as you already have everything else in place. Read on to learn about all the parts that go into a basic network and how to connect them.

What's In The Box. Start assembling a network from a kit by looking over the components and checking your installation instructions. Take a moment to read over them at least twice and highlight warnings so you won't miss them.

In the case of 10BaseT Ethernet home network kits, which operate at 10Mbps (megabits per second), your kit should contain two NICs (network interface cards), which are also called network adapters. These adapters are commonly either ISA- (Industry Standard Architecture) or PCI- (Peripheral Component Interface) style expansion cards. Newer PCs, such as those outfitted with recent Pentium processors, will accept only the PCI cards, so be sure you have the right card for your system.

There should be one RJ-45 network cable for each Ethernet adapter. Your kit should contain a network hub that is used to link your computers together. These hubs are now powered, so you'll need an available power outlet on your surge protector.

Additionally, your kit should contain NIC driver software, which lets your computer's operating system communicate with the network adapter.

Your kit may also contain Internet sharing software so that all your home computers can share a single IP (Internet Protocol) address. In these setups, one computer shares its Internet network connection with the rest of the family's computers.

Your kit might contain a CD with documentation you can read with your Internet browser or Adobe Acrobat software.

Finally, for the kid in you, most home kits contain games that are either demos or commercial offerings.

Companies now offer 100BaseT Ethernet, or Fast Ethernet, home kits that create networks running at 100Mbps. These networks substitute a network switch for a hub, allowing a mix of 10Mbps and 100Mbps cards to operate on the same network. Network switches are also very efficient traffic cops that eliminate bottlenecks on busy networks. You can still speedily print out your company report while the kids battle it out in a network game.

The newer Fast Ethernet cards support the WOL (Wake-On-LAN [local-area network]) feature that lets you turn on a computer through a command from the network. To install this feature, you must have a newer Pentium PC with a WOL motherboard connector for the WOL jumper cable. You also should check the machine's CMOS (Complementary Metal-Oxide Semiconductor) settings to ensure WOL is enabled. Using WOL requires running a WOL utility such as Wol_set.exe, which comes with the Linksys Etherfast Switched 10/100 Network in a Box kit.

HomePNA (Phoneline Networking Alliance) kits lack network hubs or switches because they rely on the home's phone wiring to route network traffic among PCs. These kits contain two PCI HomePNA NICs, two RJ-11 phone

Key Points

- Ethernet is a proven networking technology that's popular in businesses and many homes.
- If you don't want to install Ethernet cabling in your home, try a network that communicates through telephone wiring.
- Setting up a network includes two basic steps: connecting the hardware and configuring software settings for each connected computer.

cables (identical to your phone or modem cables), instructions, driver software, and possibly games. Be sure to purchase a kit built under the newer HomePNA 2.0 specifications. Older kits will run only at 1Mbps instead of the new standard's 10Mbps, but the newer units are backward-compatible with the HomePNA 1.0 devices.

Vendors simplify the process of connecting a computer to a network by offering USB (Universal Serial Bus)-to-Ethernet and USB-to-HomePNA external network adapters. This type of network adapter doesn't involve opening the PC and installing a card. Instead, you just plug the adapter into a free USB port. To get the best USB performance, you should be running at least Windows 98.

■ **Ethernet Networks.** Ethernet offers the home user a number of advantages. First, it is a well-understood network technology. That means that all components have been thoroughly used in the business world, and installation and configuration problems are well understood.

Secondly, notebook PC users can connect PC Card Ethernet cards to both their home LAN and company LAN. Users can disconnect their notebooks from the office network, carry them home, and then connect them to the home's Ethernet hub.

Finally, Ethernet matches up well with high-speed Internet access equipment. If the home connection uses a cable modem, a DSL (Digital Subscriber Line) modem (sometimes called a DSL router), or an ISDN (Integrated Services Digital Network) router/modem, then the home user can connect the home's Ethernet network directly into the modem's Ethernet port. This means that you can use one type of network throughout the home, which makes troubleshooting much easier.

Placing the hub. You obviously should place your network hub or switch in a location that lets the attached network cables reach each computer in the room. Using 25-foot cables means the computers must be within a 25-foot radius of the switch. The network hub or switch should be in a dry place. If you're in a basement, you can put the hub on a computer desktop. Don't put it on the floor where flooding could damage it.

Home networking hubs and switches use transformer power adapters, so you'll need a power socket with plenty of room for the oversized plug. You may have to rearrange a few power cord connections or your surge connector to make this work. Connect the power adapter's DC power plug to the hub or switch and then plug the adapter's AC plug into the surge protector.

Laying out the cable. Next, lay out the cables to each PC's location. Try to keep excess cabling coiled to minimize tangles of cables behind computer desks. The 3Com HomeConnect RJ-45 network cables provide the nice touch of letting you unwind the cable from the center of the coil without untying the coil.

Installing the cards. Now it's time to install the PCI cards. Currently, Fast Ethernet home networking kits come with PCI network cards that you must install inside each PC on the network. PCI cards only work with Plug-and-Play PCs, so you'll have to use ISA cards if you're hooking up any 486-class machines to your network.

The instructions from the card's manufacturer will guide your installation, but you'll generally need a Philips, a standard screwdriver, or a set of nut drivers. Lower the risk of shock and electrical burns by removing watches and rings before working on anything electrical.

Start the card installation by turning off the PC. Next, turn off the surge protector switch or unplug it from the wall. As an additional safety measure, you should unplug the power cable from the back of the computer. This will protect you from accidental electrocution and your computer's components from damage.

Open the computer case and find an empty PCI card expansion slot. In older Pentium PCs, you may find three ISA slots followed by two PCI slots. The newest Pentium III PCs include only PCI expansion slots.

Remove the expansion slot cover, using either a screwdriver or a nut driver. The covers on PCI slots are offset, so you might get fooled into removing the wrong dust cover on the first attempt.

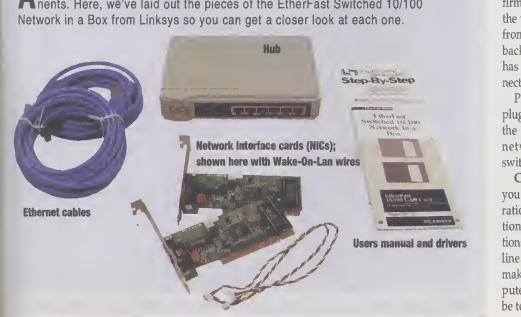
Insert the PCI card in the expansion slot, making sure it's fully seated. Press down firmly on the card to make sure it slides all the way into the slot. To keep the PCI card from popping loose, screw the slot cover back into place. If your PC motherboard has the WOL feature, you should now connect the WOL jumper.

Put the cover back on the computer, plug the power cord back into the rear of the computer, and then connect the RJ-45 network cable to the network hub or switch.

Configuring the network. Be sure you read your manual's network configuration procedures and follow the instructions. The basic steps in most configurations will correspond to the following outline. First, power up each computer and make sure it starts Windows. As the computer begins loading Windows, you will be told to load the network card drivers.

Five Easy Pieces

Although not all network kits are exactly the same, they do have similar components. Here, we've laid out the pieces of the EtherFast Switched 10/100 Network in a Box from Linksys so you can get a closer look at each one.



After installing network cards in each PC, you will be able to share files and printers. The 3Com HomeClick package and Intel's AnyPoint software make this very easy to do.

Insert your vendor's CD-ROM or PCI card driver diskette and wait for the computer to finish loading the software. You will also be prompted for your Windows setup CD-ROM or diskettes to finish installing network files. Make the changes your manual dictates for the network control panel. Once you finish these steps, restart the computer.

Repeat these steps for each computer. After installing your network card, you will be able to share files and printers. The 3Com HomeClick package and Intel's AnyPoint networking software make this very easy to do. The software tells you what to do during networking setup. Afterwards, menu choices let you make or delete network shares.

Other kits have additional manual network configuration steps. Carefully read the kit installation instructions before going any further. The instructions are based on the following procedure.

First, open the Control Panel from either the Start Menu's Settings option or within My Computer. Open Control Panel's Network applet. Once the Network applet is running, select the Configuration page. In the list box called The Following Network Components Are Installed:, you should see the Client For Microsoft Networks, your kit's network interface card, the NetBEUI protocol, and the TCP/IP protocol.

The NetBEUI (NETBIOS Extended User Interface) protocol handles network file and printer sharing for small networks. TCP/IP (Transmission Control Protocol/Internet Protocol) is used for larger network operations, such as accessing the Internet.

You need to add File And Printer Sharing For Microsoft Networks. You can use the Add button to see the Select Network Component Type dialog box. Highlight the Service option and then click the Add button. When the Select Network Service dialog box appears, choose the File And Printer Sharing For Microsoft Networks service and click the OK button.

Next, click the File And Print Sharing button in the Configuration window to open the File And Print Sharing dialog box. To share files, click the checkbox beside I Want To Be Able To Give Others Access To My Files. If you want to share your PC's printer with other PCs on your home network, click the checkbox beside I Want To Be Able To Allow Others To Print To My Printer(s). Once you've made your selections, click the dialog box's OK button.

Select the Network applet's Identification tab. You will see your computer's name, the workgroup name, and the computer description field. Your computer name can be up to 15 characters long but can't contain blank spaces. The Workgroup name can be up to 15 characters long and can contain blank spaces. The computer description field can be blank. Outsiders who browse your computer through the Network Neighborhood will be able to read this field. You could name your computer "homeplate" and make it part of the "baseball fans" workgroup. The computer description could read "This is Iggy's computer. Be nice to it!".

Finally, click the Access Control tab. You should use the Share-Level Access Control option. User-Level Access Control is used only in larger networks, where a type of computer called a domain controller authenticates user logon.

After you've completed your selections, click the Network applet's OK button. You will be prompted to restart your computer.

After the restart, you're ready to set up sharing of individual folders. You'll have to use either My Computer or Windows Explorer to find the folder you want to share. To share a file folder, right-click it. (Don't be fooled by the My Documents folder on the Win98 Desktop. It's actually a shortcut.) In the folder's context menu, select the Sharing option to open the Sharing page in the folder's Properties dialog box. To share the folder, click the Shared As radio button and enter a share name. By default, the folder name is used, but you can change this if you like. The comment field lets you further describe the share for people who are looking at this resource through Network Neighborhood.

The Access Type option lets you control how others will access the folder contents. If you don't want them to change, add, or

Phoneline networking setups, such as Intel's AnyPoint, let any phone outlet become a network connection.

delete files, you should use the Read-Only option instead of the Full option. The Depends On Password option lets you set one password for read-only access and another for full access.

Passwords should be easy to remember but hard to guess. Don't use names, words, or easily guessed number sequences. Passwords should be at least seven characters long and use both letters and numbers. One good approach is using the first letter of each word from an easily remembered phrase, such as "Into the valley of death rode the six hundred." This password would look like "itvodr t6".

Don't share either your entire hard drive or your WINDOWS folder. Some viruses, such as the Explore.zip Internet worm, can travel among machines on a LAN, looking for machines that are sharing all of drive C:. Once you've completed your folder sharing choices, click OK to make the changes take effect.

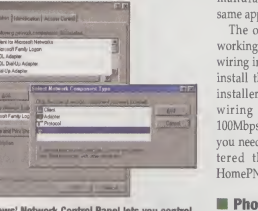
Printers are shared through the Printers applet found on either the Start Menu's Settings option or through the Control Panel. Choose the printer you want to share and right-click it. Select the Sharing option and fill out the share options.

The Share Name lets you make the share name the same as the printer name or choose a new one. The Comment line lets you explain to users browsing your computer what kind of printer you have. The Password line lets you choose a password if you want to limit access to the printer. After you've finished making your selections, click OK to put the changes into effect.

Setting up a network on your own is much easier if you have experience with adding an expansion card and installing card driver software. First timers may find the combination of installing a card for the first time and setting up network settings a little daunting.

Networks without the cards. If you don't like installing network cards on your computer, you can try the alternative of 3Com's HomeConnect 10Mbps USB-to-Ethernet external adapter kit. It's very easy to install, but your PC must be running Win98. To install the USB-to-Ethernet external adapter, follow the same procedures for setting up your network hub as you did with the Fast Ethernet example.

Next, shut down your computer. Now connect the USB cable to the external adapter. Locate an open USB jack on the rear of your computer and plug the adapter's USB cable into the USB jack.



Windows' Network Control Panel lets you control the level of access that network users have to each computer.

Then, plug a network RJ-45 cable between the external adapter's Ethernet jack and one of the hub's ports. Turn the PC on. When prompted by Windows, install the Microsoft HomeClick software. The HomeClick installer will guide you through the rest of the steps.

Overall, we liked the 3Com HomeConnect USB-to-Ethernet kit the best of all the network kits we've looked at recently. While many network kits had excellent quality, 3Com's attention to detail really shone through. 3Com was the only kit to offer a Win98 Second Edition (SE) upgrade. This is because the Microsoft HomeClick software uses the Internet Connection Sharing option that is part of Windows 98 Second Edition.

HomeClick, developed jointly by 3Com and Microsoft, is an easy-to-use network interface available only in HomeConnect network kits. The HomeClick Network Center application automatically makes a number of network setting changes that users normally make through the Control Panel's Network applet. The Network Center adjusts file and printer sharing and changes Internet sharing options through easy-to-understand menus. The built-in diagnostics really help chase down problems as they arise. The Microsoft HomeClick software is so effective at solving a number of installation snafus that other manufacturers are starting to take the same approach.

The obvious downside of Ethernet networking is that almost no homes have CAT 5 wiring installed in every room. Whether you install the cabling yourself or hire a cable installer, an installer will have to test the wiring and certify that it runs at least 100Mbps. This can be an expensive option. If you need to network several computers scattered throughout the house, consider HomePNA networking.

■ **Phone Line Networks.** HomePNA (Home Phoneline Networking Alliance) adapters look much like Ethernet adapters, except they have two RJ-11 jacks and require no network hub.

Overall, the HomePNA networks are just as reliable and fast as conventional 10Mbps Ethernet.

The two RJ-11 jacks on each HomePNA network adapter are standard phoneline jacks. One jack is used to connect the adapter to the wall phone jack. The HomePNA design ensures that network traffic will not interfere with telephones, fax machines, or DSL equipment. The second RJ-11 jack can be used for several purposes.

Because HomePNA adapters use your home's phone wiring for network connections, you won't need a network hub or switch to link HomePNA networked machines. You can **daisy chain** two HomePNA adapters together. Daisy chaining lets you place HomePNA machines in a room with only one telephone jack, which is handy for linking notebooks to your HomePNA network. Daisy chaining also allows quick expansion of your home office network without additional telephone jacks. Simply use RJ-11 cable to connect the "Wall" jack on one card to the "Phone" jack on another card. You also can connect either a telephone or a computer modem to your home's phone

Overall, the HomePNA networks are just as reliable and fast as conventional 10Mbps Ethernet.

Terms To Know

10BaseT—The most common and easiest type of Ethernet LAN to install. This type of network uses network hubs and switches with Cat 5 cabling and RJ-45 connectors. Its maximum data transfer rate is 10Mbps.

100BaseT—Known as Fast Ethernet, 100BaseT has a maximum data transfer rate of 100Mbps. It uses network devices and Cat 5 cabling rated for the higher speed.

Cat 5 (Category 5)—A standardized rating for twisted wire pair wire cable used in local-area networks to support network speeds up to 100Mbps.

Ethernet—The most common type of computer network architecture. Standard Ethernet operates at 10Mbps.

HomePNA—The Home Phoneline Networking Alliance. A group of companies (http://homepna.org) working on networking devices that connect into a LAN through existing home telephone wiring.

IP addressing—A method of assigning unique numerical designations to computers operating under TCP/IP (Transmission Control Protocol/Internet Protocol). IP addressing uses groups of four numbers linked together by three periods, and each number can range from 0 to 255. Your ISP will assign you an IP address.

NAT (Network Address Translation)—This enables a network administrator to assign individual IP addresses to a number of computers on the protected side of a network, while allowing these computers to use only one routable IP address to communicate with the rest of the network on the unprotected side of the device.

network hub—An electronic device used to link several computers in a computer network.

NIC (network interface card)—A circuit board placed in one of your PC's expansion slots to support a connection to a LAN. The expansion slots can be EISA, ISA, or PCI.

RJ-11—A type of cable connector commonly used on the cords for telephones and computer modems.

RJ-45—A type of cable connector commonly used with business phones and Ethernet computer networks.

wiring through the second jack.

If you decide you don't want to daisy chain two machines, and you want to hook both to the same telephone wall jack, you can use a regular phoneline splitter to let both PCs use the same jack.

You install PCI HomePNA network cards and their software into PCs just as you do Ethernet cards. And as with Ethernet card setup, you will need to use your Windows diskettes or CD-ROM to install the remainder of the network software.

If you don't want to open your PC to install a HomePNA card, you can also use an external USB-to-HomePNA adapter. The Intel AnyPoint 10Mbps external network adapter uses a four-foot USB cable to connect the adapter to the USB port.

Like all HomePNA devices, the external adapter has two RJ-11 jacks. Unlike the 3Com USB-to-Ethernet adapter, the Intel USB-to-HomePNA adapter needs an external power adapter, which means the AnyPoint adapter is always turned on.

Like the 3Com USB-to-Ethernet adapter, the USB-to-HomePNA adapter is considered by manufacturers to be a very hot idea. Expect all major home networking vendors to offer their own versions by midsummer of 2000.

■ Notebook PC Considerations.

Notebook PCs present some minor challenges for any type of home network because the notebooks must be ready to accommodate the different settings that could be in effect on networks at the office and home. For instance, home networks usually use the Client for Microsoft Networks and file and printer sharing, with access control set to Share Level control. This is known as peer-to-peer networking, where individual PCs share printers and files without some form of centralized control.

Some businesses use Novell NetWare, or an NT domain, which does set up centralized control of network resources. This requires access control to be set to user level control. So if you use a notebook PC at both home and work, you'll need some way of switching network settings back and forth.

If you use a 3Com HomeConnect networking product, you can install the Microsoft HomeClick software on the notebook PC. This will ask whether you want to use home or office network settings and makes switching back and forth very simple.

For other network products, you can use the Control Panel's System applet to set up two different hardware configurations. Create one named "Home" and one named "Office." This will let you have separate network settings for each. If you're a road warrior, you've probably used this approach to set up a notebook PC's modem for use away from the office.

For HomePNA networks, Linksys offers a HomePNA 1.0 card that connects through a PC Card slot. This older standard runs at 1Mbps instead of 10Mbps. The HomeLink PhoneLine+ 10/100 card (Part number PCM100H1) contains two RJ-11 jacks and a fast Ethernet RJ-45 jack and costs about $79.

This configuration lets a notebook PC connect to both Ethernet and HomePNA networks. The Linksys design is very convenient because it lets you keep separate settings for both networks. If you have an immediate need for a card like this, you may want to consider using it until a HomePNA 2.0 PC Card comes out.

Linking an existing Ethernet network with a new HomePNA network might also seem like a daunting task. But Linksys offers the Linksys HomeLink Broadband Network Bridge ($89, part number HPES03), which links an Ethernet network to a HomePNA network at 1Mbps. Again, if you have an immediate need, this is a good solution.

■ **Internet Sharing.** Many homes have only one way to connect to the Internet. This

is usually either through a standard dial-up modem, a DSL connection, cable modem, or ISDN connection. It may be impractical to give each PC its own direct Internet connection, which means you need a setup that lets all the home's computers share a single Internet connection.

This can't happen without special software that lets you pass many PCs through a single modem-equipped PC. If your DSL modem or ISDN modem is properly set up, it can allow a number of PCs to access the Internet through it. However, it may have been installed by the phone company with only one allowable Internet address.

Systems for sharing Internet access rely on setting up a single machine with two network cards (or a network card and a modem) so that the machine can act as a gateway to the Internet. Depending on the Internet-sharing product you're using, this PC could have a standard dial-up modem or a direct Ethernet connection to a DSL or cable modem.

These systems all let a family use a single IP (Internet Protocol) address to access the Internet. The Internet gateway machine assigns the machines on the network IP addresses that aren't used beyond the family's home network. These addresses belong to a special class of IP addresses called nonroutable IP addresses. The scheme of substituting a single IP address for a number of addresses is called NAT (Network Address Translation) and is commonly used in firewalls, proxy servers, and routers.

All Internet gateway setups are actually proxy servers using these numbers. A **proxy server** is a type of firewall that intercepts network traffic and passes it on to the destination machines. When a destination machine replies, the proxy server intercepts the network traffic and sends it to the originating machine.

If you're using a DSL modem, you're already using a NAT address, most likely from the 192.168.0.0 - 192.168.255.255 range. Your DSL modem actually has your public IP address and changes your network packets from private NAT addresses to this outside address once they leave the DSL modem. Once the network traffic reaches your proxy server software, it makes a further address change and assigns a new number to the traffic.

You can keep track of all these numbers and change them yourself in a process called static IP address mapping, but if possible, you should avoid using static IP addresses. It's easier to let the computer automatically receive an assigned IP number. This is called **dynamic host configuration protocol (DHCP)**. Manual IP address changes require a number of entries in the Windows TCP/IP properties. There's a greater likelihood of making typos, and you'll have to manually keep track of the addresses used. For a number of other technical reasons, static addressing is best done by someone with a technical networking background.

To select the DHCP addressing option, open the TCP/IP properties in the Control Panel's Network applet. On the IP Address page, select Obtain The IP Address Automatically option. Click OK on the IP Address page and then click OK again to close the Network applet. You will be asked to restart your PC to bring DHCP into effect.

For instance, Midpoint Lite uses the IP address 192.168.0.1 as the proxy server address. It then uses DHCP to assign all the other IP addresses for the family network. You must then change the proxy settings in the Internet browser of each of your family's computers to use the Midpoint Lite proxy server. With HomeClick this is not necessary.

The quality of home networks is definitely increasing. The products from 3Com and Intel indicate that engineers are really thinking about what the home network user needs. Easier networking controls and tightly integrated diagnostics tools with ample online help show that manufacturers at last realize that home networking has come of age. LS

by Bill Hayes

For More Information:

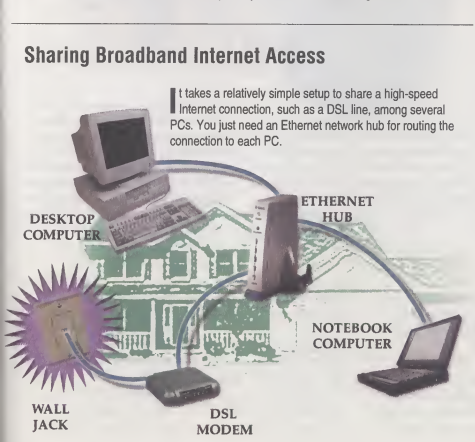
3Com
(800) 638-3266
(408) 326-5000
http://www.3com.com

Intel
(408) 765-8080
(877) 649-5817
http://www.intel.com

Linksys
(800) 546-5797
(949) 261-1288
http://www.linksys.com

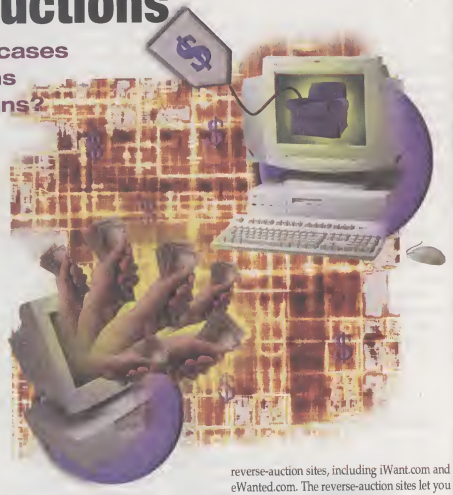
Sharing Broadband Internet Access

It takes a relatively simple setup to share a high-speed Internet connection, such as a DSL line, among several PCs. You just need an Ethernet network hub for routing the connection to each PC.



Buy & Sell Items At Online Auctions

Are These The Showcases For Bountiful Bargains Or Buyer Beware Signs?



Admit it. You like bargains. You like saving money and cutting corners so that someday you can put your kids through college and stay out of the poor house. But, as we know all too well, you don't have the time or energy to hit garage sales early or shop from store to store for the best prices.

That's why online auctions seem so appealing. You have the opportunity to get items, slightly used or occasionally new, at great prices. You don't have to get up at 6 a.m. to find the good deals, and you don't have to drive all over town. Actually, you don't even have to leave the house. With online auctions, you can sell just about anything and have a widespread market that includes almost anyone.

On the downside, however, you are bidding against everyone else online who might have an interest in a particular item and the ability to drive up the price. Of course, you can't be completely sure that the person on the other end is telling you everything about the item he is selling, or if he will pay you what you ask if you are the seller. Also, if you do buy online, don't forget to add the cost of shipping and insurance to the total price of your item.

We checked out some of the biggest and most prominent online auctions, including eBay, Yahoo! Auctions, CityAuction, and Amazon.com Auctions. We also looked at auction sites that commonly sell manufacturer overstock and demonstration models, such as uBid and Egghead.com, to see what they had to offer. Finally, we explored a couple of new reverse-auction sites, including iWant.com and eWanted.com. The reverse-auction sites let you post what you are interested in buying, and the sellers come to you.

Once we got a feel for the online auctioning atmosphere, we bid on a couple of items and attempted to sell a couple of things online to see how easy it is. We also wondered if we

Key Points

- Check the feedback ratings for buyers and sellers. Then provide your own feedback after completing your auction transactions.
- Don't bid for the same items in a number of auctions unless you are willing to pay for that many items. You are legally responsible for all of your bids.
- The majority of auction bidding takes place on the last day of the auction. Make sure you're watching during the last few minutes if you really want an item.
- Browsing and buying are generally free. Listing an item for sale may cost you a small fee, as well as a small percentage of the sale for the service's commission.
- Check other listings to estimate how much to charge when selling an item, as well as how much you should expect to spend when buying.
- Use search features to narrow down listings or look for auctions closing that day.

would have success collecting our money when it was all over.

What To Expect. Granted, you won't find an interactive auctioneer calling out bids. But you might be surprised by how long the wait can be in most cases. Unlike ordinary, live auctions in which you bid against other bidders in real-time, the sites we tested required us to place a bid and wait for days until the auction closed to see if we won the overall bid. With this scenario, most items don't even see action until the last day of the auction.

You also might be surprised by the amount of items up for sale. It's not as overwhelming when you first access an auction site's home page because everything is organized into neat little categories, but once you get inside the categories and numerous subcategories, there can be an immense amount of items to choose from. These items are not just collectibles and garage-sale items, but things such as CDs, video tapes, and other everyday items.

Most of the listings looked similar from site to site. And within the listings, items included a description, current price, number of bids, and time left in the auction. Once you selected an item, you could view a photo, read information about the seller, link to comments about the seller, or ask the seller a question. You could also read a detailed description, find out about payment options and shipping costs, and read a bidding history on that product.

It's true that in the smaller auction houses you may only find a few items in some categories, while others are filled with listings. In the bigger sites, such as eBay, it takes pages and pages of listings just to get through the items that are closing that day in many of the categories. The Search tool can be your best friend. Type in a word or two, and you can pull up a couple of pages of items that meet your requirements.

Your other best friend is the **proxy bid**, also called a maximum bid or automatic bid on some sites. When you place a bid, you can also discreetly indicate how high you will go on that item. That way, if anyone else bids against you, the auction service will automatically place the next bid for you, all the way up to your maximum bid. If someone still outbids you, the auction service will send you an e-mail to warn you that you've been outbid.

We discovered that maximum bids weren't the only thing that we needed to know before we could get into these online bidding battles. Private auctions, Dutch auctions, reserve prices, and escrow services are terms that everyone should familiarize himself with before entering an online auction. (To find out what you should know, see the "Terms To Know" sidebar.)

The eBay auction ranks one of the biggest online auction sites on the Internet with about 4.4 million items for sale.

Rules Of The Game. There are a number of rules that you should understand before you start bidding and selling. For example, before you can bid or sell an item, you have to register with most sites. Browsing is free, and you aren't required to do anything to access a site and browse. To bid on an item at most auction sites, you have to get a username and password. If you are a seller, you will probably also have to register your credit card number because most sites charge a small fee for posting an item to sell, maybe just a mere 25 cents, as on eBay. In addition, they charge a small percentage of the price once you sell an item.

If you bid the same amount as another user, the first bidder gets the bid. Another major rule is that bids are legally binding. That means that if you bid on an item and you win the auction, then you are legally responsible for payment for that item. The seller, of course, may simply opt to go with the next highest bidder if you try to back out, but you can be held legally responsible for your bid if the seller wants to follow through with the process. For this reason, you probably don't want to bid on several of the same items at the same time. If you are the highest bidder on more than one infant car seat, for example, you will be responsible for buying all those infant car seats. Most services, such as eBay and Amazon.com, also insist that the buyer and seller contact each other within three days, or the seller can look for another buyer.

Many of the auction sites connect to escrow services, such as i-Escrow (http://www.iescrow.com) to provide third-party assistance in helping buyers and sellers with the exchange of money and products. Some also allow the use of services such as PayPal.com (http://www.paypal.com), which lets buyers purchase items with their credit cards at online auctions and helps sellers collect those credit card payments.

Once the sale and exchange of money and product(s) is over, both parties can leave feedback about one another. Although this is optional at most services, it is important because it is the only way that other auction goers can see if other users are responsible buyers or sellers. Some services let buyers and sellers leave a numerical rating for each other, such as Amazon.com's five-star rating. Other services, such as eBay, CityAuction, and Yahoo! Auction, encourage users to leave comments such as positive, negative, or neutral, which add up to a number rating. (Positive is +1, neutral is 0, and negative is –1.)

Other users can check the feedback of a seller before they buy from them, and the same goes for buyers. The more positive feedback a seller or buyer has, the safer you feel about dealing with them. Some services, such as eBay, give users four chances before indefinitely banning them if they fail to come through. CityAuction and eBay even put special icons next to the name of users who have changed their usernames within so many days, just in case someone changed their username to get away from bad feedback.

The eBay Experience. You can't talk about online auctions without mentioning eBay (http://www.ebay.com). The eBay site is one of the biggest online auctions. Its categories include Automotive, Collectibles, Sports, and Antiques & Art, just to name a few.

At eBay, you can place a single bid, or take advantage of a proxy bid that lets eBay continue to increase your bid until it hits your maximum. The site includes a feedback service for each buyer and seller that you can refer to with a glance to see how many positive, negative, or neutral comments someone

has acquired. Participants with more than 10 feedback remarks get special icons next to their names. For example, someone with 10 to 99 remarks has a yellow star, while a shooting star represents someone with more than 10,000.

Browsing is free and requires nothing from you. Buying, on the other hand, requires that you register with eBay, giving eBay your name, address, e-mail address, and phone number. Afterwards, eBay sends you an e-mail to make sure your address is correct.

Selling also requires that you register, along with providing a credit card number. The reason is that there are a few charges involved with listing an item, including about 25 cents to post a simple item for sale. You also must pay anywhere from 1.25% to 5% of the total item sale, depending on the purchase amount. If you want to feature your auction, it costs $14.95 to feature it on a category page or $99.95 to feature it within the featured auctions, which are randomly picked as features for the home page. There's also a $2 charge to get your listing in bold or $1 to put a gift icon next to it.

Sellers can determine the means of payment they will accept. For example, they may decide to take money orders or personal checks. Or, they can take advantage of eBay's Billpoint payments if they want to receive credit card payments. The cost is 39 cents for the standard service fee on each sale of up to $10. For amounts more than $10, it's 39 cents plus 3.9% of the item total.

In addition, eBay can refer you to an independent escrow service, i-Escrow. The buyer sends his payment to i-Escrow, which holds the money until the buyer receives the item and it meets all the standards agreed upon for the item. The escrow company then sends the payment to the seller. The cost is $2.50 for the transaction, plus 2% for cash or 4% for credit up to $25,000. However, eBay insures most of the transactions that take place for up to $200, minus the $25 deductible. For this, every user is covered at no charge.

■ **Say Yahoo! For Auctions.** Yahoo!, the mega online search portal, also has its hand in the online auction jar (http://auctions.yahoo.com). It ranks number two in the United States in size. Categories range from Antiques & Collectibles and Business & Office to Trading Cards and Travel & Transportation.

Again, there's no obligation to browse, but you must register to place a bid or sell. Registering at Yahoo! Auctions to buy products requires very little information. You simply give them a username, e-mail address, and password. Of course, you are required to provide a credit card number to sell an item, just in case you are charged any fees. For example, for $1 extra, you can put a gift icon next to your listing. Or, for $2 extra, you can put your listing in bold.

Within each category and subcategory, Yahoo! Auctions features several products with photos at the top of the screen. There is also a list of featured items above the regular listings. In both cases, the sellers paid a few dollars extra to get their items at the top in the prime buying spots. You have to pay at least 25 cents a day to be on the featured list, and the more you pay, the higher up on the list you

Terms To Know

bid increment—The amount that you can increase a bid. For instance, if the bid is $1, and the bid increment is 50 cents, then the next acceptable bid is $1.50.

buy price—This is the price set by the seller that, when met or exceeded, will end the auction with the person matching or exceeding the buy price as the winner.

Dutch auction—These auctions are best for people who have several of the same items to sell. For instance, let's assume someone has 10 items and will sell them for a minimum of $5 each. If 10 people bid $5 for one item, they all get the items for $5 each. However, if five people bid $6 for one item, and 12 people bid $5, the five people who bid $6 will each get one item and the first five people who bid $5 will each get one item, but the other seven bidders will be out of luck. Even so, all 10 of the people who receive items will get them for $5 each because that was the lowest winning price. So, it doesn't hurt to bid a little more in a Dutch auction because you might end up paying less.

escrow service—These services act as a trusted third-party for a small fee. First, the seller sends the product to the escrow service, and the buyer sends its payment to the escrow service. After it verifies the payment, the escrow service sends the product to the buyer. Once the buyer is satisfied, the escrow service sends the seller the payment. This process reduces the risk for both the buyer and seller.

private auction—In a private auction, the usernames for the sellers and buyers are not disclosed because it might discourage people from buying a particular item if their identities were known.

proxy bid—Also known as maximum or automatic bids. When you place a proxy bid, you secretly determine the maximum amount you want to bid on a particular item that only you and the auction service know about. For example, if an item is selling for $5, you can place the next highest bid of $6 and tell the service that you're willing to go as high as $25 to get that particular item. As the auction continues, the service will continue to increase the bid until you either win the bid or the maximum bid is met. Then, the auction service may send you an e-mail message warning you that you've been outbid. This lets the bidder stay in the bidding battle without having to directly and continuously check the auction site.

reserve price—This is a price that the seller sets. If the auction doesn't reach this price, the item doesn't sell. The opening bid may be lower than the reserve price, but it won't sell until it meets this price. The reason why sellers might use this arrangement is when they don't want to sell items below their market value.

sniping—Placing a last-minute bid in an attempt to steal the bid away from someone before they can place another bid. When bidders use maximum or proxy bids, they can hopefully thwart sniper bids because the system will place another bid for them if the sniper hasn't bid too high.

get. This cost isn't that much if you consider that selling is free.

When you actually look at the listings in Yahoo! Auction, you might find that it resembles a toy department the day before Christmas. It's stuffed with clutter, and categories are often filled with items that don't belong there. For instance, when we visited the stroller section in the baby area, we found changing table covers for sale. Yahoo! has a Neighborhood Watch Program that is supposed to let frequent users watch for inappropriate merchandise, spam, or items that might be in the wrong category, but it's just not enough.

Yahoo! Auction offers automatic bid features (similar to the proxy bid at eBay) in which it continually increases your bid until it reaches your maximum price. There's a My Auctions section where you can keep track of items you are selling or bidding on or that you've added to your Watchlist. After the auction is over, you can also rate the seller with positive, neutral, or negative ratings and then add your own comments. You also can give them an Excellent, Good, Average, Poor, or Bad rating.

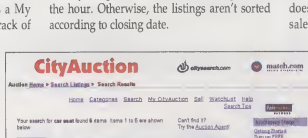
In addition, Yahoo! Auctions has an Auction Booth feature that lets you link your selling listing to a Web site so you can further promote it. It can also connect with i-Escrow if you want to enlist an escrow service for your transaction. You can blacklist a bidder with this service if you've heard bad things about someone and don't want them bidding on your particular item. You can also receive e-mail if a particular person has a new auction or if there is a particular item up for auction.

CityAuction Comes To Town.

Once known as Utrade, CityAuction is another popular online auction site (http://www.cityauction.com). This auction service offers a number of auction types for sellers who want a little flexibility. For instance, there are the traditional auctions (also known as English auctions or Yankee auctions), as well as Dutch auctions. There are also Classified auctions, in which there is no price listed, and the buyer and seller meet and decide on a price. In a QuickWin auction, bidders obtain items when they meet the threshold price. If you have several similar items to sell, you can use an AutoMarkdown feature to reduce prices until you get rid of all the items. Or, there's a Reserve Price auction available. This is the auction that indicates a set price that the item must meet, or it won't be sold.

One interesting feature located on the home page is Auctions Near Me. Give CityAuction your address and ZIP code, and it will search within a set span of miles for listings on its site. There aren't as many categories and subcategories at CityAuction, especially when compared to a service such as eBay. In fact, there just aren't as many items for sale, but that can make it easier to move products for some users.

You have to register to bid or sell. Just give the service your name and address information and agree to the Terms & Conditions, and the service e-mails you a password. It's a good idea to sort listings according to items closing soon, just opened, or that are closing within the hour. Otherwise, the listings aren't sorted according to closing date.



With most auction listings, such as this example at CityAuction, items display next to their descriptive title, current price, number of bids, and time left in the auction.

At CityAuction, you rate buyers and sellers according to positive, neutral, and negative ratings, similar to the other services. There's a MyAccount section to keep track of your selling and bidding items. There's a separate WatchList to keep track of items you might want to bid on. If a user changes his username, the service places a special icon next to the new username as a cautionary warning to others. This is helpful if the user has several negative comments on his record and wants a new name to continue selling with a fresh start.

The cost of selling an item depends on the price. It costs 5% of the purchase price for selling items up to $25, 2.5% for selling items up to $1,000, and 1.25% for selling items more than $1,000. To be featured on the home page, it's $25. To be featured on your category page, it's $10. And to list your item in bold, it's $2.

If you want to use an escrow service, CityAuction can refer you to i-Escrow.com, the same escrow service connected to eBay. There's also a Request It service for sellers to help them find buyers interested in particular products. And buyers can use the Auction Agent to warn them when specific products go up for sale in set categories.

An Amazon.com Bonanza.

Amazon.com may have made its name in book sales, but it also offers users a special place to buy and sell their own items. When you visit the auction portion of Amazon.com, you have two choices. You can decide to go to the regular auction listings. Or, you can visit the zShops where the price is set. Here, you bid the price the seller asks and get the product right away.

To begin, go to http://www.amazon.com and click the Auctions tab at the top of the screen. You may notice that Amazon.com doesn't offer as many categories or items for sale. Also, we found that many of the categories contained nonrelated items, making it hard to find what you are looking for. Plus, you will need to register to buy or sell at Amazon.com, and that requires a credit card, even if you are only buying. The service uses the credit card information to verify your identity if you are a buyer, and it charges your fees to the card if you are a seller. The service uses an automated maximum bid feature similar to the other services, only it calls it a Bid-Click.

Sellers can opt to receive credit card payments through Amazon.com Payments. The cost is 25 cents per transaction and 2.5% of the transaction amount. When an item appears with this check mark, you can pay with a credit card, and the money goes into the seller's bank account automatically. Amazon.com can also connect you to the i-Escrow service to set up payments.

However, Amazon.com offers several unique features for buyers and sellers. For example, it offers an Amazon.com A-to-z Guarantee. This ensures that you get what you pay for (for up to $250). And this goes up to $1,000 if you also use Amazon.com Payments. Amazon.com's First Bidder Discount feature lets sellers offer the first bidder a 10% discount off his bid price. When items include this option, it's an advantage to bid first, because you can bid a little higher and get the discount, possibly discouraging other bidders. However, if the item has a Take-It Price amount, the First Bidder Discount does not apply. If the bid is $20 for a croquet set, but there's a Take-It Price of $25, you can just bid the $25 and end the

auction right away, getting the croquet set without continuing the auction.

To see who you are dealing with, there is a one- to five-star rating system so you can see feedback and comments from other users. Its Going, Going, Gone feature protects you from sniper bids at the last minute. This feature extends the bidding if someone places a bid in the last few minutes so you have a chance to bid again. Amazon.com can e-mail you if an item you have been looking for becomes available through Amazon.com Alerts. The Your Account feature doesn't let you track auctions, however. It is used more to check your other Amazon.com orders.

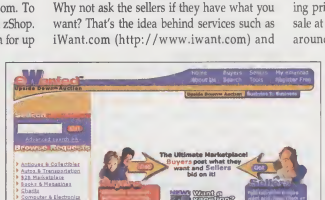
There's no cost to buy at Amazon.com. To sell, it costs 10 cents to post a listing in a zShop. Then it costs 5% when you close an item for up to $25, $1.25 and 2.5% of any amount more than $25, and it costs $25.63 plus 1.25% of amounts more than $1,000. These amounts are the same for its auctions, but the closing fees are waived if you use the Amazon.com Payments service. To feature an item, it used to cost from $2 to bold your listing and $99.95 to feature an item on the home page. But Amazon.com recently introduced a new program that lets sellers bid against one another for featured placement on the home page and category pages. Bidding starts at 5 cents per day, and sellers are notified when they are outbid.

■ **Sale Prices.** If it's electronics or computer gadgets you're looking for at low-end prices, check out uBid (http://www.ubid.com) or Egghead.com (http://www.egghead.com). Unlike other auction sites, not just anybody can sell his or her products through the service. These sites auction items they've received from manufacturers or resellers to registered users. Items at both sites may be new, resealed, refurbished, used, or demonstration models. The advantage, of course, is that you can buy them for less than store prices. At uBid, however, outside vendors are able to go through a process to receive approval from uBid to sell items and join its Auction Community.

At uBid, there aren't as many categories and listings. Similar to the other auction sites, most listings on uBid include pictures and a way to set a maximum proxy price, track your bids through My Page features, and receive auction alerts if you are watching for a particular item. Unlike other auction sites, however, many items are still under manufacturer's warranty.

Egghead.com combines the Egghead superstore products with the online auction service. Egghead.com primarily sells computers and home office equipment, but there are some sports and travel packages available, too. We didn't find an automatic bid feature that updates your bid for you here, but there is an auction extension feature to extend auctions for last-minute bids. Most listings include photos and may still be under company warranty.

■ **Reverse Auctions.** Perhaps you just can't find what you are looking for online. Why not ask the sellers if they have what you want? That's the idea behind services such as iWant.com (http://www.iwant.com) and eWanted.com (http://www.ewanted.com). You post your request, and sellers will contact you if they have it. Requests are for regular auction items, or things such as guides on vacations, puppies, and moose heads.



Reverse auctions, such as eWanted.com, let you post what items you want so the sellers can come to you.

It doesn't cost you anything to post a "want" at either site. There's also no charge to read other people's requests because they include their usernames, not their real e-mail addresses.

The service makes money by charging the sellers to reply to your requests. The Power Seller Plan at iWant.com gives sellers unlimited replies for $19.95 a month, along with online business cards and other similar features. There's also a Basic Seller Plan at iWant.com with 10 free replies for no cost; instead, sellers pay commissions. It starts at 50 cents for items up to $25 and up to $75 for items more than $10,000. But if you act soon, both buying and selling is free on eWanted.com. Around July, the service intends to start charging sellers.

As far as checking out the sellers, iWant.com suggests that you check with the Better Business Bureau or pay with a credit card that ensures you against fraud up to a certain amount. At eWanted.com, the service has set up a feedback system for a little security.

■ **Catch The Bidding Buzz.** We decided to try our luck at the online auction block. After shopping around, we discovered that medium-priced, durable, double-seat strollers cost between $130 and $160. So, we checked out the online auction sites. On some sites, we didn't find any double-seat strollers. We found one on Yahoo! Auctions, but with four days left, it was already priced at $80, and that seemed high. We found another double-seat stroller at Amazon.com, but its starting price was $75. Then we found several for sale at eBay with reasonable opening prices of around $50, so we decided to register and start bidding.

We dove right in and bid on a stroller by Graco. According to the seller, it was new and still in the box. The seller had 81 positive comments over the past six months and wanted a money order, so we placed a bid. The current bid was $51 and was increasing in increments of $1. We placed a $52 bid, with a maximum of $60 because we were also required to pay $15 for shipping and handling.

Bidding is easy at eBay. Scroll to the bottom of an item listing and type your maximum amount into the Your Maximum Bid field, and eBay then bids the next highest increment for you. This doesn't have to be the next highest amount, it just has to be how high you are willing to go. Next, enter your username and password in the fields provided, and click the Place Bid button. If you are the high bidder, eBay sends you a confirmation e-mail. If you've been outbid, the service will also let you know that, too.

At this point, there were eight more days left in the auction, so we didn't bid on any other strollers. We simply waited to check back in a couple of days to see how the bidding was going. For two days, we received e-mails informing us that we were the top bidder. The first day the bid remained the same. The second day someone had raised the bid by a dollar, and then eBay raised it another dollar for us, making the new bid $54.

After about three or four days of being the top bidder with our maximum bid of $60, eBay e-mailed us that we had been outbid. Of course, caught up in the excitement and really wanting that double-seat stroller, we decided

to increase our maximum bid to $70. Evidently, the person we were bidding against must have set his or her maximum proxy bid higher than $70 because the bid went from the $62 bid we made, automatically up to $71 in favor of the other bidder.

At that time, we decided to go back and see if there were any other double-seat strollers available for less money. As luck would have it, we located another new in-the-box stroller that was only bid to $48.99 at the time. The listing didn't include a picture, but it included the stroller model number, which was the same as the one we were bidding on before. We bid $49.99 and set our maximum bid at $60. We also decided to make sure this stroller had front and back seats, and that the seats were not side by side. We clicked the seller's name to send her an e-mail and check the seat positions.

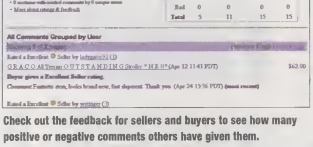
Once we received her reply that the seats were front and back, we continued bidding. As the auction came closer to an end, we were continually outbid. Eventually, we set our high bid at $86, guessing that other bidders might use a more rounded amount like $85. When we became the current high bidder, we planned to check back an hour before the auction closed to see how close we were to winning.

Bidding really picked up at the end of the auction, and we went back and forth with another bidder the last hour until we finally gave up at $95. Another bidder who hadn't bid on the stroller until the end of the auction won the auction for $96.

We then checked the price of the first stroller we had been bidding on. It was now $96. We were determined not to leave eBay empty-handed, so we bid $97 and put our maximum at $101. Another stroller we had been watching was now also in the $90-$95 range, so we assumed this must be the going price.

We checked in again a few minutes before the auction ended, and we were still the high bidder at $101. Once the auction closed, we realized that we won the bid and received an e-mail about contacting the seller within the next three days to arrange for the transaction. The next day, the seller contacted us and indicated where to send her money order. When she received the money order, she would send the stroller. We sent out the money order the next day, and about a week later, we received the stroller in the mail. It was in perfect condition, new in the box. The seller had already left us a positive feedback message, commenting that we were quick payers. We left a positive comment for her, as well, adding to her numerous existing positive comments.

In hindsight, we probably got caught up in the auction buzz at the end. If our common sense had been with us, we might have waited for another sale. True, the other stroller we were watching did sell for $96, but another double-seat stroller that was slightly used and had a starting price of $75 didn't even receive a bid. Futhermore, a new double-seat stroller that sold a couple of days later went for $85.



Check out the feedback for sellers and buyers to see how many positive or negative comments others have given them.

No Selling Expertise Needed.

Since buying turned out to be such a positive experience, we decided it was time to sell an item: a Pfaltzgraff tablecloth and matching napkins that had never even been taken out of the package. We decided to try to sell the items together on eBay because eBay seemed to have a large amount of traffic. We checked the going rate for tablecloths in other listings and found that most sold between $5 and $15.

To begin, we clicked the Sell button at the very top of the eBay site and selected the highlighted words: "provide a valid credit card." The service prompted us for our credit card number and the expiration date. We gave eBay our number and address, then eBay verified our card with the credit card company and sent us an e-mail to confirm.

When we returned to the Sell form, we selected a category for our item. On the following form, we entered our username and password in the spaces provided. Then we had to type in a title for how the item should list and choose subcategories. In the Description field, we entered what we wanted buyers to know about our item, including how it looks, if it has any flaws, and what we expect for shipping.

Next, we needed to provide an image of the item. We clicked Tutorial for more help. As requested, we scanned a photo of our item into the computer in the .JPG format (you could also use a digital camera for this). Then, we decided to use one of the image hosting services that eBay recommended called Pongo (http://www.pongo.com). The first three images you upload are free, and Pongo keeps them online for 30 days. After that, it's 50 cents for each image, and the user is in charge of making timely payments.

We clicked Image Hosting on the left side of the Pongo site and then clicked the Instant Upload button. We had to enter our e-mail address and a login name to do this. Next, we clicked the Browse button to find the file on our computer, typed a name for the file into the field, and clicked Upload.

We noted the location of our picture online and clicked a link to go back to eBay. We typed the link address in the Picture URL field. We decided not to display our item in the Gallery or feature special icons, so we selected the appropriate boxes. The other selections we made included choosing to have the buyer pay for shipping and handling, only shipping in the United States, accepting money orders and personal checks, entering $8 as the Minimum Bid, and running the auction for only seven days.

When we clicked the Review button and were satisfied with how the listing read, we clicked the Submit My Listing button to list it. Every day we received a status report on our item through e-mail, but it didn't receive any bids. We started to worry that no one would bid on our item. Fortunately, a couple of hours before the auction ended, someone bid the opening price for the tablecloth and napkins. After we exchanged e-mail messages, the bidder agreed to send a check, and we sent her the package after the check cleared through our bank.

We're Sold.

Overall, we had a positive experience buying and selling at the online auctions. We were surprised to discover that most items don't receive much attention or traffic until the last hours of their auction. Although it's safest to go with reputable sellers, we definitely recommend that users check out what items are available. There's a lot of great stuff out there. You may never have to leave the house to shop again. LS

by Cindy Krushenisky

Buy & Sell Stock Online

Selecting An Internet Broker Depends On Your Investment Needs

At first glance, the dozens of online investing sites don't look that much different from one another. Most offer such things as market news, research, investment tools, stock quotes, various account options, and on-screen portfolios that keep track of your investments. In addition, many of these Web sites attract new customers with special incentives, such as a cash deposit in new accounts or free trades.

Upon closer examination, however, we found they do differ in a number of ways, most notably in the commission fees they charge per transaction.

The Best Fit. If you're considering using an online brokerage, look for the one that best fits your investment needs and habits. For example, do you have only a modest amount of cash available for an initial deposit? Be aware that some brokerages require as much as $25,000 for certain accounts. Are you a busy trader, making transactions throughout the day or week? Then choose a site with cheap commissions or deep discounts for active traders. Are you new to buying and selling stocks? If so, you may require a brokerage with vast research resources and personal assistance.

Researching and rating online brokerages is a full-time job, and one of the best resources for this information is Gómez.com (http://www.gomez.com), an authority in e-commerce. At this site, you can find scorecards that rate all sorts of Internet businesses, including online brokerages. The folks at Gómez.com rate online brokerages in six categories, including overall score, based on 100 or more criteria. See the "Top 20 Online Brokerages" sidebar for more information. This is a great tool to use when you need to decide which one is right for you.

Our purpose here, however, is not to rate online brokerages but to acquaint you with a few of the prominent ones, pointing out the startup costs and fees you would incur if you opened an account and traded stocks with that company. As an example, we'll walk you through the process of opening an account at E*TRADE, which ranks first in overall score at Gómez.com. In addition, we will provide you with tips for picking an online brokerage. Because each person's investment needs differ and the ever-changing nature of Web sites, we encourage you to thoroughly research any online brokerage before you open an account.

Ameritrade

With its $8 equity market trades for online transactions, Ameritrade is appealing to the do-it-yourself investor. What's more, that commission fee applies to any size of trade, whether 100 or 1,000 shares. Touchtone phone trades are just $12 each, and broker-assisted transactions cost $18. (Stop and limit orders incur an extra $5 charge.)

Ameritrade offers numerous types of accounts. Standard accounts include individual, joint, and custodial; and specialty accounts include investment clubs and trusts. In addition, you have many individual retirement accounts (IRAs) from which to choose. To fund a standard individual account, you need a minimum of $2,000, but $1,000 will open an IRA.

Novice investors will appreciate the site's Education Center, which contains a stock market overview and a glossary, where you can learn about everything, including **baby bonds** (those worth less than $100) and white **knights**, which are companies that rescue other companies from hostile takeover

Key Points

- Compare your online brokerage options before you select one. Make sure you check out the features and prices for each.
- It's easy to find commission fees of less than $10 online.
- Any investment in the stock market is a gamble.
- Once you decide on an online brokerage account, make sure you thoroughly research (yes, do more research) the company before you open an account.

attempts. Based on the site demonstration, which shows such things as a sample equity order and the Positions page, which is a summary of a customer's holdings at the beginning of the business day, the Ameritrade site appears to be easy to navigate and use.

http://www.ameritrade.com

Charles Schwab

Like other brokers that made names for themselves in the pre-Web days, Charles Schwab offers its online customers the option of trading in person, in this case, at one of the 300 branch offices of the company. You also can conduct your business via the phone or through its site.

Not surprisingly, with the big broker name come bigger commission fees. Trades through the Charles Schwab Web site cost $29.95 for up to 1,000 shares or 3 cents per share for trades of more than 1,000 shares. Broker-assisted trades, of course, cost even more. However, the site does give an Active Trader Discount for high-volume traders, which can mean fees as low as $14.95 per trade.

This Web site offers 10 general types of accounts. The Schwab Account, a standard brokerage account, requires a minimum of $5,000 to open. To open a Schwab IRA account, you need $1,000.

At the Charles Schwab site, you'll find extensive planning tools for things such as saving for college and retirement. You also find plenty of investment advice at the Analyst Center. If you're new to investing, be sure to use the Investor Profile tool, which creates a profile of your investment needs based on your answers to a short questionnaire. In addition, visit the Investment Basics section, which provides educational material about such things as understanding market cycles and asset allocation.

http://www.schwab.com

Datek Online

Given the volatility of stock prices, it's important in many situations that brokerages execute market orders as quickly as possible. Datek Online claims to provide some of the fastest executions of all Web brokerages. In fact, Datek promises that if it doesn't carry out your online order within a minute, it will wave the trade commission, which is $9.99 for market, limit, and stop orders of up to 5,000 shares. (Certain restrictions apply.) Orders placed via the phone incur a surcharge of $15.01.

Opening an individual, custodial, or joint account with Datek requires a minimum initial deposit of $2,000, and you can fund it via check, electronic transfer, or stock certificates. There is no minimum deposit to open an IRA account.

Most online brokerages advertise the fact they offer stock quotes, but whether they are free and/or real-time varies from site to site and even within sites, depending on the type of account a customer may have with a brokerage. Datek gives its customers free, unlimited real-time quotes. In addition, with its Streamer service, Datek users can watch continuously updated quotes pop up on their computer screens. Similarly, Datek updates its customers' portfolios in real-time.

http://www.datek.com

E*TRADE

There's something for every investor at E*TRADE, including research tools, discussion groups, and the E*TRADE Game (which helps novice investors learn how to play the stock market with $100,000 of "play" money). In fact, there's so much to read and do at this site that E*TRADE encourages visitors to become members even if they are not ready to become customers (those who have opened and funded an account). Members get up to 100 free, real-time quotes each day, personalized market views, and a free e-mail account.

To become an E*TRADE customer, you'll need $1,000 in cash or securities for a cash account or $2,000 for a margin account. You can choose from eight account types, such as individual, joint, and investment club and eight retirement accounts. Commission fees start at $14.95 for trades up to 5,000 shares made on major stock exchanges; limit orders, stop orders, and trades involving Nasdaq stocks cost $19.95 each. You can place your orders through the Web site or TELE*MASTER, which is a touchtone and speech-recognition telephone system. For trades of more than 5,000 shares, you'll pay an additional penny per share. Broker-assisted trades incur an additional $15 fee.

With the Power E*TRADE program, the more you trade, the more you save. If you make at least 30 trades in a quarter, you'll get a $5 rebate on every trade after 30. Make 75 or more trades in a three-month period, and your rebate will be $10 per trade after the 75th trade. With both of these higher levels of trading, customers receive other benefits, such as real-time streaming portfolios and after-hours trading privileges.

http://www.etrade.com

Fidelity Investments (Powerstreet)

Users of Powerstreet, from Fidelity Investments, have a plethora of quality tools at their disposal. For instance, with the Real-Time Research tool, you can obtain customized stock reports and market newsletters. (Some are fee-based.) Interactive calculators and worksheets include an IRA evaluator and commission calculator, by which you can estimate what it will cost to make trades through Powerstreet. The InstantBroker service gives you updated stock alerts and the ability to make trades via a two-way wireless pager, a PDA (personal data assistant), or e-mail.

Commission fees start at $25 per trade. Active traders, those who have made 36 trades in the last 12 months, can make transactions for as low as $14.95 each. Powerstreet offers 15

This is how Streamer, which is a real-time, continuous stock quote service from Datek Online, would appear on a user's computer screen.

general account types. To open a Fidelity Ultra Service Account in which you can buy and sell stocks, bonds, options, and mutual funds, you'll need a minimum deposit of $5,000.

http://personal100.fidelity.com

Merrill Lynch

Customers of Merrill Lynch's online brokerage have two basic ways to invest: independently (with Merrill Lynch Direct) or with the assistance of Merrill Lynch financial consultants. You can find access to both of these on the home page by clicking the Be Self-Directed button and the Be Guided button, respectively. (Both are on the left side of the page.)

With Merrill Lynch Direct, you can open either a Cash Management Account (CMA), with an initial minimum deposit of $20,000 in cash and/or securities, or an IRA, with a minimum initial deposit of $250. Market

orders placed through a CMA cost $29.95 each or 3 cents per share if the order is more than 1,000 shares.

If you choose professional assistance, you have two more options. The Unlimited Advantage plan lets you place unlimited trades by phone, through the Internet, or in-person at a Merrill Lynch office. Merrill Lynch will charge you an annual fee based on the value of your eligible assets. You also can opt for a more traditional fee-for-transaction account. Fees in this latter account begin at $50 for trades, involving up to 100 shares.

http://www.ml.com

Morgan Stanley Dean Witter Online

The iChoice service platform from Morgan Stanley Dean Witter lets you select one of three ways to invest: self-directed, brokerage-guided, or a combination of the two. And that's just the beginning of your options.

You also can choose to make your investments through the Internet; by automated telephone; at one of 450 branch locations of MSDW; or via TradeRunner, the company's wireless trading service. In addition, MSDW Online boasts a Mutual Fund Center with more than 5,000 funds, plus an Investment Basics section loaded with helpful information for novice investors, such as "The Wall Street Journal Guide To Understanding Money."

However, before you choose how to trade, you'll need to choose an account. The five standard accounts MSDW Online offers are individual, joint, guardianship, estate, and custodial. Each requires a minimum deposit of $2,000 before you can begin to trade. No minimum investment is required for an IRA.

Commission fees for MSDW Online compare favorably with other real-world brokerage houses that also offer online trading. For example, trades involving up to 1,000 shares of stock cost $29.95 if made electronically and $39.95 if made with the assistance of an MSDW representative. Beyond 1,000 shares, the fees cost 3 and 4 cents per share, respectively.

http://www.online.msdw.com

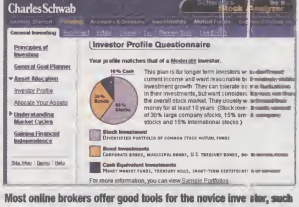
National Discount Brokers

For investors of modest means, National Discount Brokers (NDB.com) is a dream come true. There is no minimum deposit to open an individual, joint, or custodial account, and just $2,000 in cash or equity is required to have a margin on your account.

NDB.com's commission fees are attractive, too. Market orders are $14.75 if made through the Web site, $19.95 if made via a touchtone phone, and $24.95 if made with the help of a broker. In addition, with the Active Trader's Advantage, you can make multiple trades of the same stock on the same side of the market (such as either all buying or all selling) on the same day—up to 5,000 shares—all for one commission.

You'll find plenty of helpful tools at NDB.com, such as live market commentary for active traders, a Basics Of Investing section for new investors, and StockFinder Pro, which is an advanced stock screening service for investors who want to buy and hold stock long term.

http://www.ndb.com


Charles Schwab
Investor Profile Questionnaire
Principles of Investing
General Goal Planner
Asset Allocation
Investor Profile
Allocate Your Assets
Understanding Market Cycles
Gaining Financial Independence
Your profile matches that of a Moderate investor.
10% Cash
40% Bonds
50% Stocks
This plan is for longer term investors who
current income and want reasonable
investment growth. They can tolerate
in their investments, but want considera
the overall stock market. They usually
money for at least 10 years. (Stock
of 30% large company stocks, 15%
stocks and 15% international stocks.)
Stock Investment
Diversified Portfolio of Common Stock Mutual Funds
Bond Investments
Corporate Bonds, Municipal Bonds, U.S. Treasury Bonds, or
Cash Equivalent Investments
Money Market Funds, Treasury Bills, Short-Term Certificates
For more information, you can view Sample Portfolios.

Most online brokers offer good tools for the novice investor, such as the Investor Profile feature at the Charles Schwab Web site.

TD Waterhouse

You need only $1,000 to open and fund an individual, joint, or custodial account with TD Waterhouse. Commission fees for self-directed trades made through the Web site are relatively low, only $12 for up to 5,000 shares. Thereafter, it costs 1 cent per share, per order.

Fees jump considerably, however, if you trade via TradeDirect, the touchtone phone service of TD Waterhouse. That service costs $35 per trade, and you will pay $45 per trade if you enlist the help of an Account Officer. Both price quotes are for trades of up to 5,000 shares.

But you can save money in other ways by trading through TD Waterhouse. It's one of the few online brokerages we encountered that offers free, unlimited real-time stock quotes to all its customers. (At other online brokerages, for example, the free stock quotes advertised are often delayed 15 or 20 minutes.) In addition, at the time we visited, it was offering three free trades for referring someone else to the Web site. And through TD Waterhouse's webBroker, its online trading service, account owners have access to plenty of free investment information, including stock screening and Zacks Investment Research and Analysts' Recommendations.

http://www.waterhouse.com

■ **A Painless Process.** Although we didn't actually open an account with any of the online brokerages we checked out, we can

Terms To Know

limit order—An order to buy or sell in which you set a price, or limit, regardless of the present market price. When buying, you place the limit at a specified price below the market price. When selling, you place the limit at a specified price above the market price.

margin—Buying a security on margin means borrowing money against your account. A margin call will occur if the market value of the securities in your account falls below required maintenance levels.

market order—An order to buy or sell at the present market price.

options—Contracts giving the owner the right to buy (call) or sell (put) the underlying stock at a specified price (strike price). Options have a limited time value and can be extremely speculative investments. Special approval is required to trade options.

stop order—An order to buy/sell at the market when the price increases/decreases to a specified level.

Source: Morgan Stanley Dean Witter Online

tell you the process seems painless. For example, E*TRADE gives you the option of applying via postal mail or online through its new Account Express program. If you choose to apply through the mail, you must complete a brief on-screen form to request an account kit. We did this and received the kit in the mail in less than a week.

We requested a kit for a personal account. The kit contained a two-sided account application, an account transfer form, a customer agreement brochure, information about new E*TRADE features, and a postage-paid return envelope. You could complete the application and account transfer form in 10 to 15 minutes.

If you choose to open an E*TRADE account through Account Express, you'll need to complete an online form that is pretty much the same as the form you would receive in the mail. (*NOTE: You can open an individual, joint, custodial, or IRA account online. For all other accounts, you must request a kit via mail.*)

In completing the individual account application, you would need to choose either a cash, margin, or margin with options account. Then, you must indicate how you would fund the account, such as with a check; stock certificates; or an electronic transfer from a bank, brokerage, or mutual fund. You must provide your postal and e-mail addresses, social security number, employment status, and investment objectives.

When you're not putting your money to work buying stocks, it will work for you in a money market fund earning daily interest. Thus, you also must select the type of fund where your cash balance will reside. Options include a money market portfolio, government securities portfolio, and tax-exempt portfolio. E*TRADE will mail you a prospectus for the portfolio you select.

■ **Click & Trade.** Through on-site tours and demonstrations, we got a feel for how a stock trade would work via an online broker. On E*TRADE's Stock Order screen, for instance, you indicate the type of transaction you want to make, type in the number of shares and the stock symbol, select the price (market, limit, stop, or stop limit), and choose the time frame in which the trade can be made.

At Fidelity Investment's Powerstreet, you can make simulated trades that will introduce you to the process of acting as your own trader. First, select the type of transaction (buy, buy to cover, or sell) and then type in the number of shares and the stock symbol. Next, select the order price type (market, limit, stop loss, or stop limit) and the time in force (day, good until canceled, fill or kill, immediate or cancel, on the open, and on the close). Then you'll need to determine the conditions of your trade: none, all or none, do not reduce, and all or none/do not reduce. Finally, select how the trade, if it's a purchase, will be made: with cash or on margin. Click the Preview Order button to review your order, and, if it's correct, click the Place Order button to start the transaction.

Remember: although you can quickly place your order, it may take some time to complete the transaction, depending in part on your instructions. Be sure to inquire of the online broker you select how much time may elapse before it completes your order.

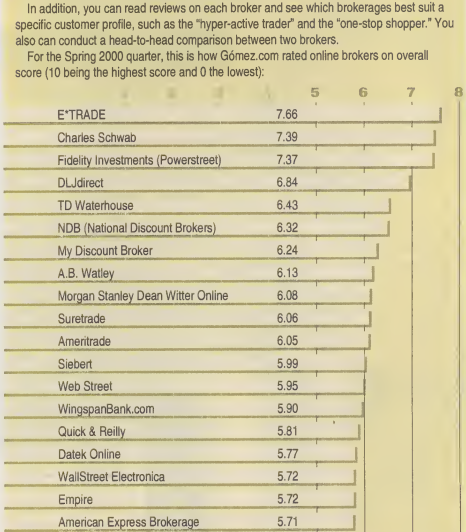
■ **Pros & Cons.** Given all the hype surrounding online investing, you may think you're living in the Stone Age if you're not wheeling and dealing on Wall Street through your PC. But just like everything else in life, there are pros and cons to online investing.

Top 20 Online Brokerages

At Gómez.com (http://gomezadvisors.com), a leading authority on Internet commerce, you can find scorecards on all sorts of Web-based businesses, including online brokerages. It ranks the investment sites in six categories: overall score, ease of use, customer confidence, overall cost, on-site resources, and relationship services.

In addition, you can read reviews on each broker and see which brokerages best suit a specific customer profile, such as the "hyper-active trader" and the "one-stop shopper." You also can conduct a head-to-head comparison between two brokers.

For the Spring 2000 quarter, this is how Gómez.com rated online brokers on overall score (10 being the highest score and 0 the lowest):



Pros. So as you consider whether to open an account with an Internet brokerage, here are some more things to consider. First, a summary of some advantages to online investing:

- **Cost.** As we've shown you, it's easy to find commission fees of less than $10 online. Compare that with your friendly broker, who probably charges you at least $40 per market order.
- **Convenience.** This is what the Web is all about. You don't have to leave your home—or even get out of your pajamas—to do such things as set up retirement accounts and purchase shares of a promising stock. In addition, you can conduct research and place orders after regular business hours.
- **Competition.** Just as airlines wage price wars to fill the seats of their planes, online brokerages also constantly make pitches for your business. Whether it's low commission fees, free market news and research, or extras such as free checking accounts or e-mail accounts, these companies have to give you what it takes to remain competitive.

Cons. Now, consider these potential disadvantages to investing online:

- **Risks.** Any investment in the stock market is, of course, a gamble. You are never guaranteed a certain level of profit or even that you'll make a profit. But there's another risk for new investors especially, and that's the temptation to let the ease with which you can use an online brokerage lull you into making a wrong decision. For example, those low commission fees may tempt you to make more transactions than you really need to. At the end of a day or a week, many small fees could end up costing you more than going through a regular broker to place one or two orders.
- **Restricting requirements.** For most online brokerages, you need at least $1,000 in an account before you can make a trade, and that can be a bit restricting for some would-be investors. But if you use a broker down the street, all he or she will likely ask for is the cost of the purchase plus the fee. So if you're a bit short on the required minimum deposit for an online account, you'll have to decide which is more important: buying a few stocks today at a higher fee or saving your money so you can invest in the future at lower fees.
- **Research.** Smart investors read just about anything they can get their hands on about the companies they invest in. Ultimately, it takes a lot of time and patience to select the right stocks at the right time. To be fair to investment advisors, they earn their fees through all the time and effort they spend researching stocks and watching market trends so you don't have to—not to mention their professional expertise. Before you open an online account, decide if you have the time to conduct thorough research, even if you *can* do it through the convenience of the Web.

■ **Read The Fine Print.** As you research the online brokerages that appeal to you, make sure you read the fine print. Often, those too-good-to-be-true site features or customer benefits, when explained, might not be that appealing or applicable for your investment needs.

For example, several online brokerages, including MSDW Online, Fidelity Investments, and E*TRADE, offer after-hours trading in which you can place orders after the markets have closed. Electronic order-matching systems then execute these orders. Even though this is a nice feature that professional traders have used for many years, there are many restrictions to using it, depending on the site. Under E*TRADE's after-hours trading program, for instance, only limit orders are accepted, and you must place them through the Web site. In addition, the trading time is 4:05 p.m. to 6:30 p.m. EST, whereas MSDW Online and Fidelity Investments offer longer after-hour trading periods.

If you're a novice investor, an after-hours trading feature probably should not be at the top of your list when choosing an online broker. Instead, you'll probably look for such qualities as low fees, low minimum initial deposits, and access to market research.

The good news is as your investment knowledge and confidence in your online brokerage grows, your brokerage likely will continue to upgrade and expand its features, and in this way, you can grow together. LS

by Rachel Derowitsch

Other Research Resources

If you want to obtain investment news and research on the Web, but you haven't joined an online brokerage (yet), you can get free information at the following sites. Some of these sites also offer subscription services.

Free, Real-Time Stock Quotes

FreeRealTime.com
http://quotes.freerealtime.com

Thomson Real Time Quotes
http://rtq.thomsoninvest.net

News On Initial Public Offerings

IPO.com
http://www.ipo.com

IPOhome.com
http://www.ipo-fund.com

General News & Research

Briefing.com
http://www.briefing.com

CBS MarketWatch
http://cbs.marketwatch.com

Internet Stock News
http://www.netstocks.com

Wall Street City
http://www.wallstreetcity.com

Yahoo! Finance
http://finance.yahoo.com

The Thomson Real Time Quotes Web site offers lots of free stock market information, but you need to register at the Web site first.

CHILDREN: don't talk to strangers.

PARENTS: don't become strangers.

Book Vacations Online

Make Your Own Travel Plans Rather Than Relying On A Travel Agent

Key Points

- The Internet is a great resource for travelers.
- Compare options before making a purchase by reviewing various Web sites, consulting a travel agent, and checking directly with the supplier.
- Be wary of deals that sound too good to be true.
- Use services such as Gómez.com to inspect the quality of each online travel Web site.

In the beginning, there were travel agents. We went to them on bended knee and watched in awe as they banged and clicked upon their keyboards to find the answers we were seeking. They alone knew the key to the reservation systems. We could only sit before them and accept their sage offerings with gratitude and wonder. Shaking our heads and clutching our tickets, we skulked away until the next time.

Then came the World Wide Web, and suddenly we had power at our fingertips, no longer were we merely passive recipients. Finally, we too had the ability to make our own reservations from the convenience of our own PCs.

Today, from the comfort of your computer, you can make reservations for every type of travel imaginable, whether you're a business or leisure traveler, whether you want to cruise the Caribbean or hike the Himalayas, or whether you want to stay in a five-star hotel or spend the night at a bed-and-breakfast cottage. It's all out there. You can even bid for the best price at an online auction or name your price at priceline.com (http://www.priceline.com).

But, as with any power granted to mere mortals, it comes with pitfalls and dangers. Consumers need to tread carefully through this overload of information. Perhaps the travel agent is not actually obsolete; maybe he just changed his purpose.

Either way, this article explores some of the online travel planning options available. In addition, you'll find out how to assess the quality of an online site and learn to use some online travel planning features.

The Scope Of Online Travel.

According to Forrester Research, 26 million households will be making their travel plans online by 2003. Plus, they expect the business travel segment to grow to a staggering $20.3 billion by 2004.

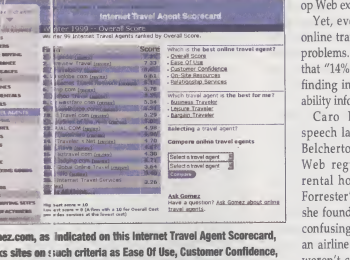
Jupiter Communications reports that travel bookings will grow from $4.2 billion in 1999 to $16.6 billion by 2003. With these kinds of numbers, many companies will be vying for your attention and money. How do you distinguish the good from the bad, the legitimate from the con artist? It's not always easy, but there are online tools available to help.

If you are new to online travel planning, you might be reluctant to use a site without some background information. Christopher Elliott (http://www.elliott.org), the columnist of "Going Off" for CNN.com (http://www.cnn.com), has been covering the travel industry since 1994. He says, "Bad business practice has nothing to do with the Internet. Bad business just went online," but as with any purchase, he says, "I hate to sound trite, but let the buyer beware." Elliott's personal travel planning philosophy is to "trust but verify."

To him, this means checking out several sources. Say you want to book airline reservations. Go online and look for the best price, but don't stop there. Call your travel agent—sometimes they have access to deals you don't know about—then call the airline directly. "Just because it's on the Web doesn't mean it's a bargain," Elliott says. Sometimes a travel

agent or reservations agent can find a price based on something you request. You may not always know how to find the best price on your own.

Rudy Maxa, host of the public radio weekend show, "The Savvy Traveler" (http://www.savvytraveler.com), has this advice when shopping for travel online: "Never buy something where you can't call to verify." Expedia (http://www.expedia.com) and Travelocity (http://www.travelocity.com) both have toll-free numbers listed on their sites (see "The Online Travel Agent" section for more information). He also strongly recommends avoiding e-mail offers for free trips or a free cruise.



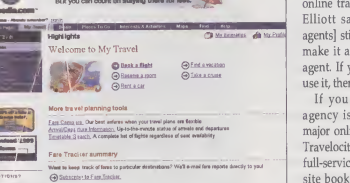
Gómez.com, as indicated on this Internet Travel Agent Scorecard, ranks sites on such criteria as Ease Of Use, Customer Confidence, On-Site Resources, and Relationship Services.

Knowledge Is Power. Just how do you verify if a site is legitimate and, for that matter, select one from so many available sites? One way is to use a site such as Gómez.com (http://www.gomez.com). It provides a scorecard on how well the online travel industry is doing based on a set of criteria such as Ease Of Use, Customer Confidence, and Relationship Services.

Gómez.com has scorecards available for airlines, car rentals, hotels, and travel agents. Each scorecard provides a rating and a short article explaining how Gómez arrived at this score. Then, you can go directly to the site of the company, examine the ratings for the company across every category, and review what other consumers are saying in an online discussion forum.

This combination of different types of information helps give you a strong sense of the overall performance of a given provider. For example, if you want to book an airline reservation from an online travel agent, but you don't know which one to use, you can go to the Gómez site, click Travel Agents, and look at the ratings of each online agent. You could then click Consumer Ratings & Reviews to see what other consumers have to say about the travel agent. While you're there, check out other Gómez Resources such as Finding A Bed & Breakfast.

This type of information can go a long way toward easing your mind about making an online travel purchase, but you may want to take it a step further. Columnist Elliott recommends asking friends. He says, "The best way [to verify a site] is word of mouth. Do your friends trust this site?"



When you click the My Travel button at Expedia's site, you'll discover the convenience of using its wizards to arrange travel needs such as booking a flight or renting a car.

The Online Travel Agent. So, if you've talked to a friend, checked an online scorecard, and are ready to book online, but you don't want to deal with all of the details yourself, the online travel agency is probably the best choice for you. The online travel agency provides a way to maintain the services of a full-service agent while providing the convenience of online shopping. As Maxa says, "Travel agents who survive and thrive will embrace the Web."

Forrester Research agrees. According to a February 1999 Forrester Research report, "Of the 20 traditional agencies we surveyed, the majority recognize that they must move online and have begun to develop Web expertise...."

Yet, even with this convenience, online travel agents are not without problems. Forrester Research reports that "14% [of those surveyed] report finding inconsistent fares and availability information on travel sites...."

Caro Lambert, a 38-year-old speech language pathologist from Belchertown, Mass., who uses the Web regularly to book vacation rental homes online, agrees with Forrester's assertion. Lambert says she found online travel agency sites confusing when it came to booking an airline reservation and says, "We weren't convinced we were getting the lowest price."

Speaking in general terms about online travel agency sites, columnist Elliott says, "They [online travel agents] still don't get it. They have to make it as easy as calling the travel agent. If you have to explain how to use it, there's something wrong."

If you decide an online travel agency is right for you, two of the major online players are Expedia and Travelocity. Expedia, for example, is a full-service travel agency offering on-site booking for flights, car rentals, hotels, vacation packages, and more. The Expedia site includes wizards, which are small programs that walk you through each activity in an effort to provide that ease of use Elliott alluded to. These include wizards for renting a car or booking a flight, hotel, vacation, or cruise. To access these wizards, go to the Expedia site and click the My Travel button in the navigation bar.

Go To The Source. One of the great advantages of booking a vacation online is your ability to deal directly with the suppliers. Instead of going through an intermediary such as a travel agent, you can go directly to the Web site of an airline, hotel, or car rental agency and find the best price yourself. This section will deal with these three types of common suppliers and explain how to book a reservation online using each type.

Airlines. Every major airline has a Web site, and you can book reservations through

the site without having to navigate through complex phone menus, wait on terminal hold listening to bad music, or deal with reservations agents. In fact, some airlines encourage use of the Web by offering a lower fare for online bookers and specials that are available only from the Web site. You can even get specials delivered to your e-mail inbox every week.

Phil Kurinsky, a senior manager for Deloitte Consulting, has been booking plane reservations through a network system or online for several years. As a business traveler, he says, "Time and convenience are most important. Price is important too, but it isn't the driving factor." Kurinsky says that he uses the Web to explore different options, but due to current company policy, all flights are booked through Deloitte's in-house travel agent.

Keep in mind that while each airline search engine is a little different, they all have the same basic elements. Some airlines require you to register before you can search, meaning you have to fill out an online application with information such as your name, address, phone number, and e-mail address. As part of this process, you select a username and password. All sites require you to provide some information, however, in order to make a purchase.

The following instructions explain how to search for a flight on the Northwest Airlines site by using its flight search feature. Northwest received high grades from Gómez.com for its Spring 2000 scorecard, landing in the top three for Overall Score, Ease Of Use, and Customer Confidence.

Follow these steps to search for a flight on Northwest Airlines' site:

1. Go to http://www.nwa.com.
2. Instead of using the Fast Trip finder on the left side of the page, click the red Advanced Search Options link. The Round Trip Search page opens. You will see a page similar to this with almost all airlines.
3. Enter your departure city in the From box. Press TAB or use your mouse to move to the next item.
4. Enter your destination city in the To field.
5. Enter your date of departure or click the calendar icon to access a calendar. The calendar defaults to today's date, but you can select any date. Switch months by clicking the arrow (→) in the right corner of the calendar. Click the date you want, and it fills in automatically in the Departing date field.
6. Select a departure time by making a selection from the Time drop-down list adjacent to the Departing field.
7. Repeat the directions for steps 5 and 6 for the returning date and time.
8. Enter the number of people traveling in each category in the Who is going on this trip section. If you have children, it is important to enter the number, as they often travel at a discounted rate.
9. Click the Class drop-down list to select a class such as business or first class or leave the default choice of Economy/Coach to search for the lowest price.
10. If you have specific search options you wish to use, check the appropriate ones, but the more you narrow the scope of your search, the less likely you are to find the cheapest fare.
11. If you have a Northwest Electronic Certificate, enter the reference number and certificate number. This could make you eligible for special discounts. Contact Northwest for more information.
12. Click Search by Best Available Fare, and NWA displays a page indicating it is searching. If you make any errors such as an invalid city (perhaps they don't fly there or you just mistyped), the Search page reappears and lists any mistakes in bright red. If the search is successful, you can review the fares. From here, you could book the flight or try a different search if you are not satisfied with the results.

Top Travel Sites

Forrester Research conducted a survey of online travel buyers and researchers and then rated sites on several criteria, including the number of reported visits, how many visitors booked on each site, and how much money visitors spent on travel each year. Based on this information, Forrester developed the list below of its choices for the top 10 travel sites online.

1 **Yahoo! Travel**
http://travel.yahoo.com

2 **Travelocity**
http://www.travelocity.com

3 **Expedia**
http://www.expedia.com

4 **Southwest Airlines**
http://www.southwest.com

5 **Excite Travel**
http://www.excite.com/travel

6 **AOL Travel**
http://www.aol.com/webcenters/travel

7 **Netscape Travel**
http://webcenter.travel.netscape.com/travel/index.jsp

8 **AA.com: American Airlines**
http://www.im.aa.com

9 **Delta Air Lines**
http://www.deltaairlines.com

10 **Infoseek: GO Travel**
http://infoseek.go.com/Center/Travel

You could use this same type of search engine on a travel agency site such as Expedia or Travelocity to find the best price from among many airlines. The NWA site (or almost any of the airline sites), of course, provides only the best price on Northwest (or its sister airline KLM).

Once you book a flight, you need to provide name and contact information such as address, phone number and e-mail along with a credit card number. With some airlines, you can choose special meals and even select a seat on the plane. You enter this information over secure servers to protect it from others. (As a general rule, never enter credit card information on a Web site unless you are certain the transaction is secure. You can tell it is secure in two ways: the address changes from "http" to an "https" address and a small lock icon appears in the Status bar of both Netscape and Internet Explorer.)

After you complete the process, the airline will send you an e-mail confirming the details of your flight. In some cases, the airline will send you paper tickets by mail. In other cases, they issue an "e-ticket." This is a paperless ticket. Instead of mailing you tickets, they mail you a paper receipt, itinerary, and a purchase confirmation number. Northwest states in their E-ticket FAQs (frequently asked questions) that "If you have a confirmation number, your reservation is confirmed."

Then, at check in, you provide a picture ID and flight information, and your reservation will already be on the system. With an e-ticket, you don't need a paper ticket, which means you do not have to worry about losing it or leaving it behind.

Hotels. Hotels have lagged behind airlines in using the Web to offer special promotions. According to an article "Navigating the Slippery Slope of Internet Hotel Rates" by Andy Hasting, published February 25, 2000 by GómezWire, Gómez Advisors conducted research on 25 hotels with online booking and found that most hotels "simply translated their existing inventory of rates online (unlike the airlines that have special Internet-only promotions)."

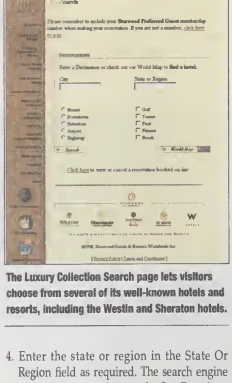
It is also not always possible to assess the quality of a hotel from a description on a Web site. Deloitte Consulting senior manager Kurinsky says, "With a flight, you know what to expect." He admits he's had bad experiences as a frequent air traveler, but he maintains a seat on a plane is pretty consistent. With hotels, he says, he has selected a hotel based on its description and price and had bad experiences.

"There's not so much a relationship between cost and quality. You could have a very high-priced hotel that hasn't been renovated in a long time and end up in a dumpy room." In this instance, Kurinsky prefers to rely on the Deloitte in-house travel agents who have the experience of knowing which hotels are better, and he trusts them to pick a good one.

The Gómez hotel scorecards present a wide range of scores, with some hotels coming in high for one category but extremely low in another. Luxury Collection, however, certainly stands out from the pack with an Overall Score ranking of three, along with a number one ranking for Leisure Guest and a number two ranking for Business Guest. It received an Ease Of Use rank of 10, placing it firmly in the middle of the pack of 20 hotels reviewed. Luxury Collection includes several well-known hotels, including the Westin and Sheraton hotels.

Follow these steps to locate and book a hotel on the Luxury Collection Web site:

1. Go to http://www.luxurycollection.com.
2. Click Hotel Search & Reservations. The Search page opens. From here you can enter details about the location of the hotel and any amenities you want.
3. Enter the City in the City field. For this example, enter San Francisco.


Search
Please remember to include your Starwood Preferred Guest membership number when making your reservations. If you are not a member, click here
Destinations
Enter a Destination or check out our World Map to find a hotel.
City
State or Region
Search
World Map
Click here to view or cancel a reservation booked on-line
Westin
Sheraton
W
©1998, Starwood Hotels & Resorts Worldwide, Inc
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The Luxury Collection Search page lets visitors choose from several of its well-known hotels and resorts, including the Westin and Sheraton hotels.

4. Enter the state or region in the State Or Region field as required. The search engine recognizes major cities, so for San Francisco, you need not enter CA. If you were traveling to a country other than the United States, you could enter a country, province, state, or other regional designation here.
5. Click the option button next to the location that most closely matches the area where you want to stay. You can only select one. For this example, select Downtown.
6. Click each amenity you want such as golf or a pool. You can select as many of these as you like. Select Pool, and a check mark appears.
7. Click Search. The search engine locates any hotels located in downtown San Francisco with a pool and finds six matches. Let's stay at the Sheraton Fisherman's Wharf Hotel, the second one from the top.
8. You could access the hotel's home page by clicking the hotel name, or you can click the Reserve A Room link directly from this page. Let's do that. Click Reserve A Room, and the Sheraton's Reservations page opens.
9. Select the Arrival and Departure dates by clicking the month and date drop-down lists for each one and then making a selection.
10. Select the number of guests and number of rooms by making a selection from each drop-down list.
11. Enter any special numbers you may have such as a corporate identification number. These may make you eligible for a special rate, so enter the appropriate number if you have one.
12. Click Check Availability, and a list of rates appears with any rooms matching your search criteria.
13. Click the Select Rate button, and a page with a summary of an available room at the chosen price appears. Review the rate rules by scrolling down and clicking the Rate Rules button. Before you accept the rate, try clicking the Hot Deals button in the navigation bar to see if you can find a better deal.
14. When you are ready to book, enter your name, address, and contact information, along with a credit card number to hold the room. Note that this site uses a secure server, so you can enter your credit card information with confidence.
15. Click Send Form. The hotel provides you with a confirmation number, and that's it. Show up on the day of your reservation, and a room will be waiting in your name.

Car Rentals. Car Rentals are the last of the big three travel planning options. Like hotels and airlines, car rental agencies have gone online and allow consumers to book directly. Kurinsky likes booking car rentals online because he is able to compare rates easily. He reports frustration, however, when trying to work with special rate codes in a centralized car rental search engine such as Expedia. You need to go directly to the supplier to take advantage of special codes.

Gómez.com offers a scorecard for eight online car rental sites. Since there are only eight suppliers, you do not have the range of choices you do with airlines or hotels, so look for one in the top three with high marks for ease of use. For its Spring 2000 scorecard, Alamo Rent A Car was number one for the Ease Of Use category, number two for the Overall Score, and in the top three for each Customer Profile (Road Warrior, Vacationer, Bargain Hunter, and Occasional Renter).

Follow these steps to book a car rental with Alamo Rent A Car:

1. Go to http://www.goalamo.com. Take a look around. Notice the clean, playful design.
2. Click Rates & Reservations in the navigation bar. The Rates & Reservations Page opens.
3. Select your country from the Country Of Residence drop-down list.
4. Enter the pickup location. This could be a city and state or a three-letter airport code. If you are going to a country other than the

United States, you can substitute the state with a country or region name.

5. Select the date you want to pick up the car by making a selection from the month, day, and time drop-down lists.
6. Enter a drop-off location if different from the pickup location. Otherwise, leave the default information (Same As Pickup Location).
7. Select the date you want to drop off the car by making a selection from the month, day, and time drop-down lists.
8. Click any appropriate Additional Equipment checkboxes.
9. Select the number of drivers from the Number Of Drivers drop-down list. If one or more drivers is between 21 and 24, select the appropriate number from the Drivers Age 21-24 drop-down list.
10. Enter any promotional or special codes as applicable.

Tip: Click the Hot Deals link to see if Alamo Rent A Car is offering any special deals. You can view the available deals without leaving the Reservations page. If you find an applicable deal, enter the appropriate special code.

11. Click Continue. The Select from These Available Cars page opens with a variety of pricing options.
12. Click the option button for the car you want and then click Continue. The Book This Car page opens.
13. From here, you need to enter some personal information, including your name and e-mail address. You can even opt to have Alamo Rent A Car's hot deals sent to your e-mail inbox each week. Notice the VeriSign Secure Site logo. This indicates that Alamo is protecting this personal information from others.
14. Click Make Reservation. The Your Reservation Has Been Confirmed page opens. Print out this page so that you have a confirmation number. Note that this merely holds your reservation. You will pay for it at pick up. If you change your mind, be sure to cancel the reservation.

Rates and Reservations
New Reservation/Rate Request
Where and when would you like to rent a car?
Additional Equipment
Driver Information

The Alamo Rent A Car site has numerous user-friendly features, including its search criteria and colorful site design.

■ **If You Never Pay Full Price.** The Web is full of travel sites, and many are devoted to the bargain hunter. For example, each week the Travelzoo.com (http://www.travelzoo.com) folks gather a list of what they call the "top 20 deals," and they put together a list of some pretty impressive bargains. You can subscribe to a newsletter that brings this list to your e-mail box each week, and you can even customize it to include only the bargains from your departure airport.

The priceline.com service has generated a lot of publicity through its unique "name your price" booking method and lively commercials featuring actor William Shatner. You can book a hotel, airline or rental car online and name your price. There is no cost to you for this service, but the chief drawback is that you must accept whatever they offer you. There is no right of refusal clause and this bothers Kurinsky. He says, "I looked at priceline, but I haven't used it. Just the idea of having to commit to something I don't know about in advance is uncomfortable."

"The Savvy Traveler" public radio host Maxa agrees when it comes to booking air flights. He needs to be a certain place at a certain time, and he does not usually have the flexibility to book using a service such as price line.com, but he has had great success using them to book hotel rooms. He says with a hotel room, you know you are going to be in a certain place for a certain number of nights and he has booked rooms using priceline.com and saved a great deal of money. You cannot name the hotel, but you can choose an area such as Downtown and hotels graded from one to four stars. Maxa tells of booking a hotel in California with three stars. (They didn't have 4 at the time.) He bid $100 and got a reservation instantly. He called the hotel later to verify for himself that he got a good price, and after negotiating, he found that the best price he could get was $175, so he saved $75 using priceline.com.

If you are not comfortable with priceline.com, you may prefer respond.com (http://www.respond.com). With this service, you enter your travel plans, and sellers respond directly to you in your e-mail inbox. You are under *no* obligation to purchase anything. You are in control, and you can choose to accept an arrangement or not.

■ **Final Departure.** When you travel, you want to get to know the place. This is especially true when you're traveling for pleasure. Still, whether you are traveling for business or pleasure, you can use the Web to find restaurants; research local attractions; or view listings for theater, sports, or music for most major cities and regions.

For example, if you want to learn about New York City, you could visit NYCtourist.com (http://www.nyctourist.com). From this site, you can read reviews of the latest Broadway plays, view restaurants by area or food style, view places to shop, and much more (including tourist tips). You can even take a virtual of tour of Yankee Stadium. Before you go, do a search in any major search engine using language such as "New York City Tourism." You should be able to locate sites with information about wherever you are traveling.

There's more on the Web than we could include in one article. If you're interested in specialty vacations, you can find information about such getaways as adventure travel or ecotours, camping, RV rentals, vacation home rentals, and so much more. You can take virtual tours of places you have never been and become familiar with a place before you get there. The World Wide Web opens up a whole new world for us.

Maxa says, "It [online travel planning] is good for the consumer. It puts more power in the hands of the consumer." And for Maxa, "that's all to the good." As with any power, you need to use it wisely. But, when armed with more information, you are bound to make a more informed decision, whether you ultimately book with a travel agent, a supplier, or a Web site. LS

by Ron Miller

Record CDs

Burn CDs For Fun & Storage

When compact discs first appeared on the market, there was little doubt they would usurp cassette tapes for listening to music and diskettes for storing data. They're sturdy, they hold large amounts of data, and they have clear playback. But for years, cassettes and diskettes still held out for one simple reason: they record.

But that was then. Now recording your own CDs for data storage and music is so standard that most new computers come equipped with a CD recorder (also called CD-R drive, CD burner, or CD writer) built in. Computer users who don't have an extra thousand or so to throw at a new system need only part with as little as $100 to install a CD recorder drive into their current system. It's a relatively simple process that will get you recording in about an hour.

As for what you can put on discs, the options are diverse. Use them to back up your computer files, play the DJ and make a mix of your favorite tunes, create and distribute your own software games, or organize the piles of photographs you currently store in beat-up shoe boxes. The beauty of recordable CDs (or CD-Rs) is that they go from CD player to computer with ease (although some older CD players have trouble reading music recorded onto CD-Rs). You can even plug them into some DVD players, although they're not all compatible. Check with the manufacturer before you drop a bundle to play your rave mix on the machine you use for watching movies.

Heaven couldn't have sent a better alternative for data storage. You can use recordable CDs to capture about 650MB (megabytes) of data on just one disc. You'd have to use about 450 diskettes to store the same amount of data.

Getting A Drive.

Before you buy any recording device, make sure your computer is up to snuff. You'll need a 100MHz (megahertz) or better Pentium processor, at least 16MB of RAM (random-access memory), and 700MB of hard drive space to record CDs. That last part is not technically a requirement for burning CDs, but it's necessary if you will be recording files to your computer before copying them onto the blank CD. When considering computer space, bear in mind that each minute of audio uses about 10MB of drive space.

If your computer meets these standards, now you're ready to get the proper media, which in this case is a CD-R or CD-RW, and the hardware, a CD burner. You know what a CD-R is: a compact disc that lets you copy data from one disc to another (or from your hard drive or an external storage device) one time (also known as WORM technology, or "write once, read many"). A CD-RW (rewriteable CD) makes it possible to erase what you've recorded and place new information over the top of it. How many times you can rewrite depends on what kind of disc you buy, but most claim you can do so up to 1,000 times. While you can record regular CD recordables on any kind of a CD burner, you can only record CD-RWs on a CD-RW drive.

There are hundreds of CD writers on the market, most of which cost under $500, so you have a tremendous selection. TDK has one of the fastest products for recording music on the market: the veloCD ReWriter (http://www.tdk.com/velocd), which you can use to burn a CD in less than 10 minutes. This really is lightning speed, as most recorders can chug out a CD in about half an hour. The reason the veloCD ReWriter moves so quickly is that it "rips" tracks super fast. Ripping, also known as audio extraction, refers to first copying a track onto your computer and then moving it from there onto the blank CD. This model retails for $349.

Hewlett-Packard makes a sturdy CD Rewriteable drive, the HP CD-Writer Plus (http://www.hpcdwriter.com). This piece of

Key Points

- Use CDs to record mixes of music or cut your own tunes.
- If you're running out of hard drive space, you can back up your hard drive onto CD.
- CDs are good for archiving old files you rarely use.
- Anything that's too big for a diskette or Zip disk can easily fit onto a CD.

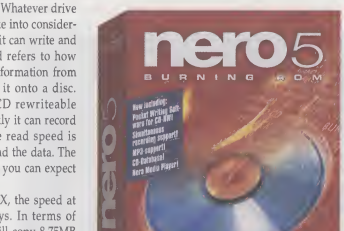
equipment, which sells for $299, lets you record and rerecord, and it works quickly and well with software. It's also a bargain considering the flexibility it gives you, although you can find more basic drives for less than $100.

The Right Drive. Whatever drive you decide to go with, take into consideration the speed at which it can write and rewrite. The write speed refers to how fast the drive can pull information from your computer and put it onto a disc. The write speed on a CD rewriteable drive tells you how quickly it can record on that disc format. The read speed is how fast the drive can read the data. The faster these are, the more you can expect to spend.

The slowest speed is 1X, the speed at which an audio CD plays. In terms of data, a 1X-speed drive will copy 8.75MB per minute. This is fine when you're enjoying Bach cantatas in your living room, but it takes forever to record CDs at this rate. A 2X drive writes twice as fast, 4X twice as fast as that, and so on. Get the fastest you can while still staying within your budget. This doesn't mean you'll always be running the drive at full tilt, because sometimes recording slower leaves less room for mistakes.

Also make sure you're getting the right kind of CD-R for the drive your computer has. Most computers have EIDE (Enhanced Integrated Drive Electronics) hookups, so this is most likely what you should buy. SCSI (Small Computer System Interface) ports are the fastest (and most expensive) drives available. Both EIDE and SCSI require internal drives. Parallel and USB ports connect to the outside of your computer, as your printer does. If you're not sure what kind of hookup you have, contact your computer's manufacturer. This determines whether you'll be installing the drive inside your computer or plugging it into the back. Follow the directions that come with whatever drive you buy to install it.

Getting CD-Rs. Next, you need to buy a supply of CD-Rs. If you're going to be cutting many CDs, then your best and most economical option is to go to one of the computer superstores, such as CompUSA or Circuit City, and buy a spool of them. You can usually buy about 50 CDs for between $30 and $50, and believe us, they get used up quickly, so this isn't as many as it sounds. If you want to buy them one at a time, expect to pay about $2 each. CD-RWs are more expensive than the standard discs, and can be about $10 each. But remember that you're not going to throw this away as you might a CD-R. You only need one for a few years' worth of backing up.



Your can purchase Nero or download it for free and use it for cutting CDs.

When you see your first CD-R, you'll notice it looks a little different from the regular CDs you buy from the store. In addition to being colored differently (blue, green, or gold, as opposed to silver), your Disco Hits from the 1970s is pressed from a mold while CD-Rs are burned with a laser. CD-Rs are more delicate, too. They won't stand up to sunlight and temperature changes as well, and they're easier to damage.

Setting Up Software. The package you bought probably came with recording software, and that software was probably Adaptec Easy CD-Creator 4, the market leader. Easy CD Creator has a few problems: for starters, it doesn't work well with Windows 2000. If you're running that operating system, be sure to install the latest version possible, currently version 4, otherwise you may have to reinstall Windows. Make use of Web-CheckUp as an ongoing process. This determines if there are updates for Easy CD Creator and automatically downloads and installs them free.

Otherwise, this program, which normally retails for $99, is ultra simplified for CD-creation beginners. It has automated and step-by-step processes for making CDs, such as CD Guide and the Create CD Menu, which lists all the functions in a simple interface. It has a feature that lets you filter the pops, clicks, and other unnecessary noise that analog recordings, such as those from cassette tapes or albums, add to music. You can even use it to create your own jewel case layouts for your creations.

After you've installed the CD writer, you can install Easy CD Creator. Just insert it into your regular CD-ROM drive and follow the on-screen instructions for setup. Now you're ready to make some CDs.

CD-R Pirates. You don't have to be a criminal mind to realize the implications of copying your own CDs. You can start to copy expensive music tracks and software, hand them out like candy to your friends, and maybe sell a couple copies under the table, right? Wrong. Before you set up shop on street corners, acquaint yourself with copyright laws.

Succinctly put, it's illegal to burn and distribute musical tracks from a copyrighted CD without the artist's permission. The Recording Industry Association of America says that, technically, even the mixed CD you made for your road trip is illegal. However, the Audio Home Recording Act of 1992 says otherwise. It says that you can make musical recordings as long as it's for noncommercial use, that is, if you're not selling them to anyone else. So, if

When you see your first CD-R, you'll notice it looks a little different from the regular CDs you buy from the store.

you want to splice your tracks together for your own mood mixes, then go ahead.

Software is a different matter. You can't make a copy of software unless you have the explicit permission of the copyright owner. Period. The only copying the law allows you to do is to install the software onto a single computer (which you have to do so you can run it), and make "another copy for archival purposes only," according to the Copyright Act (Section 117). So, as tempting as it may be, do not use your CD-R to record programs. Software producers get pretty grumpy about this, and they'd be quite happy to turn you in to the police if you do. CD recording is fun and useful, but it's not worth the risk of a massive fine.

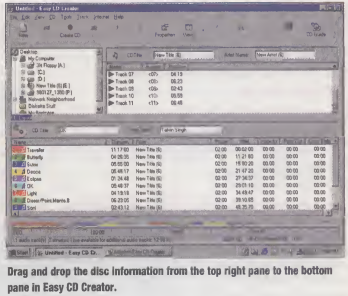
Burning Music. To get started, go to the Start menu and select Create CD from Adaptec's folder. This will launch the Create CD Menu, from which you'll choose Audio. Now you have a few choices. Audio CD lets you create CDs from another CD; Spin Doctor lets you transfer your albums to CD format; and Internet Music is actually a link to Liquid Music Player, which plays music from the Internet.

Let's start with Audio CD to copy tracks from a disc. First insert a blank CD-R into your CD writer and the CD of original music in your CD-ROM drive. If the tracks don't appear in the top right pane on the screen, click the name of the CD drive in the left pane, which is probably D: or E:, to transfer them. If you're recording WAV files or MP3 files, click the folder where they're located to add them.

Remember that you can make mixes with as many songs as you like up to 74 minutes (the capacity of standard CDs), rather than burning the whole CD in one go. This capability is called multisession recording and lets you add songs or data to a CD over time. It also means you can add WAV or MP3 files into you mix with regular CD tracks.

A handy feature of Easy CD Creator you can use at this point is CDDB, which stands for CD database. CDDB is a Web site you can access through the program. It retrieves the disc information from nearly every CD imaginable and downloads the information into your layout. This means that you can save yourself the hassle of typing in the artist's name, recording title, and song names. It's all done for you if you press the CDDB button on the top menu bar.

Click to select the songs you wish to copy from the top right pane (press and hold the Control key to select more than one) and drag them to the pane in the lower part of the screen. If you haven't used the CDDB button, or if you want to make revisions to the disc information, now's the time to do so.



Drag and drop the disc information from the top right pane to the bottom pane in Easy CD Creator.

If you're inserting tracks from more than one source, repeat these steps for each music CD you want to record from. Easy CD Creator will tell you when you have to insert a new CD during the actual recording process.

Now press the Create CD button on the top toolbar and the CD Creation Setup window will appear. Target Devices should be set for the drive where your CD recorder is. Also set the Number of Copies to what you want to make.

Next select the speed for recording the CD. Remember that setting it at 1X will record at the same speed at which a disc plays on your regular player. While 4X is probably the default, you might want to reduce that. When you're recording as fast as you can, your system might not have the resources to produce a clean data stream during the copying. In short, your CD might not turn out. To be safe, set the recorder at 2X and grab yourself a cup of coffee and a magazine.

Test & Burn. Before you click OK, press the Advanced button. This will give you access to tests to make sure the CD turns out correctly. Testing takes awhile, but it's important to do the first time you burn a disc to eliminate the likelihood of ruining it. Press the Test And Create CD button. This sends the recorder through the motions of recording a disc without actually copying any information. If something is wrong with your settings, it will be detected by this test, and you can fix the trouble. Easy CD Creator will

Terms To Know

burn—To record a CD.

CD-R—Recordable compact disc. These are used for transferring data once to be read many times.

CD-RW—A rewriteable compact disc. This format lets the CD be erased and reused. CD-RWs can be overwritten approximately 1,000 times.

cut—To record a CD.

MP3—A highly compressed data format. MP3s use a clever compression scheme called Level 3 coding in which all superfluous and redundant parts of a sound signal, the parts our ears tune out anyway, are stripped out, leaving only the relevant sounds.

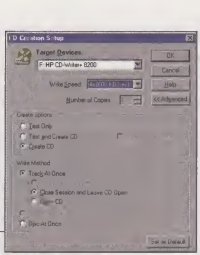
multisession recording—The ability to record information from different sources onto one CD.

rip—The act of transferring files from a computer hard drive onto a CD-R, as opposed to transferring data from disc to disc.

WAV—The standard format for storing sound files on a PC.

WORM (write once, read many)—A CD-like device that allows data to be recorded on it and then read over and over. Most recordable CDs are WORM.

It's not difficult to cut CDs, but the process can run into various snags. Little glitches mean a multitude of spoiled discs.



Recording at 4X is the default of most CD-R drives, but you should slow it down to minimize errors.

automatically proceed with an actual recording session if it doesn't find any errors. The next time you record discs, you simply can press the Create CD button. This bypasses the test and jumps to burning.

Remember that information you downloaded with CDDB? If you click Write CD-Text Info, it will copy the title, artist, and track titles onto your new CD. When you play your new disc on a player that supports this information, it will display.

Now turn to the Write Method section. Click Track-At-Once if you want to record only one track at a time instead of the entire CD. Choose Leave Session Open if you want to add more songs from different sources during this recording session. Close Session And Leave CD Open closes the session so you're free to listen to what you recorded before adding more tracks. Press Close CD when you're completely finished transferring music onto the CD. This option write-protects the disc, and you can no longer add more data. If you're writing an entire CD in one fell swoop, then click Disc-At-Once.

Click OK and make your first CD.

■ **Making Data CDs.** The process for making data CDs is just about the same. It's a little less complicated, in fact. This time, when you go to the Create CD menu, choose Data CD. The interface is the same, and the process of dragging files from the top panes to the bottom pane is the same. When you press Create CD, however, you'll see that a few of the options, such as the session buttons, are shaded because they're disabled. If a CD with data is the first you've cut, follow the directions for running a test and otherwise proceed as above for making your CD.

■ **Troubleshooting.** It's not difficult to cut CDs, but the process can run into various snags. Little glitches might not mean much in the grand scheme of things, but as far as CD recorders are concerned, they mean a multitude of spoiled discs.

Here are some tips to follow that help minimize the risk of ruining your CDs:

- Close and disable all programs before you start recording a disc and don't touch your system while recording. This includes your screen saver. CD recorders use considerable resources to make sure that data is streamed in a steady flow to the disc. Any interruption in that flow can blow all your hard work.
- Select the test option before you actually put anything onto the disc. It does take extra time, but you only have to do it once, and it will catch any errors that add up to wasted discs.
- When copying information from disc to disc, first transfer information from the master disc onto your computer hard drive, then copy from there. This takes a little longer, but recorders have less trouble reading data off the hard drive than pulling it off another CD.
- Before creating CD-ROMs, you should defragment your hard drive. As applications are installed and run, they scatter bits of information around your system. Defragging puts those particles back in their rightful place, which can speed up your computer and make it run better. Every little bit of speed helps when burning CDs.
- Remember to slow down the speed of copying if your discs are repeatedly messed up. Your CD-R drive might not be able to handle faster recording, so by slowing it down, you minimize the risk of interrupted data and of burning flawed CDs.

If you are recording from a master disc, make sure that it's clean before putting it into the CD-ROM drive. Grime can cause skips, which are either copied onto the new disc or halt recording altogether.

■ **Burning Love.** If you're getting fed up with limitations of diskettes or other storage devices, it's probably time you jumped on the CD bandwagon. Besides providing much more storage space than many other methods, burning your own CDs is easy and economical, and it can even be kind of fun. LS

by Monique I. Cuvelier

Backup Options

Here is a run-down of the most popular and reliable backup options and how much they hold:

- CD-R drives. A little slower than some removable storage drives, but they're ultra convenient and can hold 500MB (megabytes). CD-RWs will work in any CD-ROM drive on any machine, and drives come standard on many new computers.
- Removable storage drives. These are advantageous because they hold between 100MB and 2.2GB (gigabytes) of data, and they can be rewritten for saving new information over old.
- Tape cartridges. A sound option, as they're small, sturdy, and have loads of capacity. The consumer or small office/home office formats can store between 800MB and 15GB while professional units store from 20GB on up.

Digitally Edit Your Home Video

Grab The Director's Chair & Create Stunning Movies

Call it "The Shoebox Syndrome." You have a camcorder that you love and have used to faithfully capture great family moments, key business events, or perhaps that hilarious boating episode that "America's Funniest Home Videos," for some unfathomable reason, refused to air. But where are all these tapes now? They're in a shoebox taking up space in the closet.

With luck, you remembered to label them before plunging them into eternal obscurity. If only there were some way to easily take all that footage and pluck out a few minutes of outstanding clips. What would Steven Spielberg do with your tape? He'd take those choice clips, add a stirring soundtrack, superimpose some dazzling effects, and leave your audience awestruck.

Although we don't want to pressure you into making the next "Saving Private Ryan," you can at least save your videotapes from the shoebox. By harnessing your computer's power, you can perform stupendous feats of video resuscitation and production, generally with only a small learning curve and an even smaller budget. The key is in converting your analog video footage into a digital format.

Digital conversion isn't rocket science. Usually, it's only a matter of connecting a cable between your camcorder or VCR and whichever capture hardware you've chosen for your computer. Such capture devices are almost always accompanied by editing software, and these packages address the price points and needs of different users. We've selected three of the most popular video editing packages on today's market; think of them as low-, middle-, and high-end consumer solutions. We'll show you how to work some editing magic with each and hopefully cure you of The Shoebox Syndrome for good.

Digital Ease. Put simply, digital editing is much easier and cheaper than analog editing. In an analog format, editing is linear. Say you have a tape of raw footage from the last family reunion and you want to edit this down to a smooth 15-minute movie. You need a player for the master tape and a recorder for the target tape. On the master, you locate the snippets you want to copy to the target and record them, each new snippet following heel-to-toe after the next on your target tape in a sequential, or linear, fashion.

If, after working 12 minutes into your 15-minute production, you discover that you accidentally chopped off a segment around the 2-minute mark, you're out of luck. There's no way to reach into the tape and fix the error. You have to back up to that point, redo the mistake, and repeat all your previous work from that point forward.

Digital video editing, on the other hand, is similar to word processing. If you have three scenes—A, B, and C—and you decide you want B to come first, no problem. Just highlight B, cut and paste it in front of A, and voila, your movie sequence now goes B, A, C. As we'll see, you can add and edit audio tracks, overlay titles, splice in musical backgrounds, and much more.

Hardware Requirements. If you think a video editing PC and a word processing machine can get by with the same hardware, think again. Video editing is incredibly resource intensive, and unless you plan on packing a lunch and reading a book throughout your

Key Points

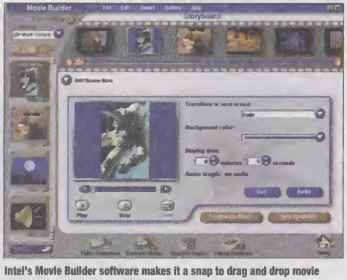
- Just about anyone can pick up a video editing package and create a movie, but to create near-professional projects, you need to get a high-end package.
- Digital video editing creates a more fluid final project than cutting and adding scene from an analog tape, allowing you to add better transitions, effects, and sounds.
- To get the most out of a digital editing package and to reduce frustration, you need a fairly powerful system. You can't expect the computer you use for e-mail and word processing to handle the load.

editing work, make sure you have the hardware oomph to tackle the task.

At the very least, most vendors recommend at least a 166MHz (megahertz) CPU (central processing unit), 32MB (megabytes) of RAM (random-access memory), and 500MB of free hard drive space. However, this is like saying a tricycle is sufficient to travel the Rockies. Sure, it's possible, but in reality, you need a 400MHz CPU, 64MB to 128MB of RAM, and 10GB or more of free hard drive space.

Every frame of video consumes a certain amount of memory. The larger the frame or the more color information contained in that frame, the more memory is required. Also, "full-motion" quality is generally defined as 30fps (frames per second). Many capture and editing packages allow for fewer fps in order to conserve space, but the end result often looks choppy and strobelike.

If possible, try to do your capture and editing with all the superlatives at your disposal: use the fastest speeds, largest sizes, etc. When your project is finished, and you're ready to export your final movie to CD-ROM, back to tape, or into a hard drive archive, then feel free to apply compression and other space-saving methods. However, applying these techniques up front can limit your editing options.



Intel's Movie Builder software makes it a snap to drag and drop movie clips on to the Storyboard and then fade into subsequent scenes.

Picking A Capture Method. To capture your movies, you need to worry about two input channels: audio and video. Your camcorder may offer separate outputs for left and right stereo. The Hitachi Hi8 camcorder we used offered two output methods. At the back of the camcorder are two RCA-style jacks, a yellow one for composite video out and a white one for audio out. On the unit's side is a single rectangular port. A special cable plugs into this that terminates in an S-Video connector, a single composite video connector, and separate left and right stereo jacks. Depending on your camcorder or VCR, you may be limited to only single-channel audio and composite video, but going for S-Video and stereo whenever possible will yield better results.

Back at the computer, most capture solutions will offer their own video input ports and rely on you to plug the audio feed into your sound card's Line In jack. (The exception is when external "breakout boxes" that offer multiple audio/video input and output jacks, are included, as with the Pinnacle DV500 detailed later.) Low-end capture devices will usually only offer composite video capability, but midrange products will add support for S-Video. Fortunately, either the camcorder/VCR or capture device (and usually both) will come with the necessary cables to make these connections. However, if your camcorder or VCR only offers composite output, there's little point in buying a midrange capture package unless you're willing to pay extra for the more robust software.

Some PCs are starting to come with video editing hardware and software built in. Sony and Apple gather the most attention in this arena, but their efforts generally focus on leveraging their IEEE 1394 (FireWire) capability to import pure DV (digital video) footage. For the majority of users still shooting with analog camcorders, we evaluated three analog-capable packages, keeping a close eye on value, ease of use, and functionality.

Intel PC Camera Pro Pack. For a measly $99 (after rebate), you wouldn't expect Intel's monitor-top Web cam (http://www.intel.com/pccamera) to be a video editing solution, but for the most basic video needs, this package's Movie Builder application does quite well for being our low-end package.

To import video, you begin by plugging the camcorder's composite video-out cable into the back of the Intel camera. The data stream is then fed to your PC by the camera's USB (Universal Serial Bus) connection. The Create & Share software gives you the option to select small (160 x 120 pixels), medium (240 x 180 pixels), or large (320 x 240 pixels) capture resolution, as well as any video input source other than the Intel camera.

Create & Share's Scene Recorder captures the video. Scene Recorder even offers a viewing screen to observe footage as it streams in from the playing device. To create a video clip, click the Record button, then stop and save the segment when you're done. Once you capture your main footage segments, you can trim them down. (When capturing raw footage, always record a little more than seems necessary at the beginning and end of your segments. This gives you more editing leeway later.) The Save Frame feature also allows for individual frames to be converted to still JPEG (Joint Photographic Experts Group) images.

Compiling a movie in Movie Builder is very straightforward. Individual items, be they still images, sounds, or video clips are saved in the Gallery area. When you minimize the Gallery, it appears as a single column down Movie Builder's left edge. From here, you can drag and drop still and video images on the top of the screen in the Storyboard area. The Storyboard is like a slide projector, with each item being a new slide in the sequence.

You also can insert a title page, which is a frame with a customizable solid color background and overlaying text. Additionally, you can link your title pages and still images to an audio file. For example, when making a short movie, we started by capturing the first 10 minutes of our videotape. By using the Trimming utility, we used a pair of sliders to establish "in" and "out" points, which are the beginning and end of a smaller clip taken from a larger piece of footage. In this way, we selected and saved four smaller clips from the raw footage and saved each as an AVI (audiovisual interleaving) file.

But we couldn't just launch into a movie without some kind of introduction, so we created a title page by clicking Add Scene

Item and selecting Add Title Page. On the following screen, we were able to enter our text and format it. Finishing this, we returned to the Scene Attributes screen and selected Audio to bring up the Audio Recorder. We then created a 20-second voice narration, which served as an introduction to the opening video clip that attaches to the title scene. When we finished recording, Movie Builder automatically defaulted the duration of the title scene display to the length of the audio segment (20 seconds), and we instructed the page to fade into the next item. (Movie Builder has three scene transitions that you can add to any still or video item: fade, dissolve, and cut.) Finally, we dragged-and-dropped the new title at the beginning of the Storyboard.

At this point, we discovered Movie Builder's chief drawback: The program only has one audio track. Our opening video clip was of a family sitting down to dinner. Amidst all the murmuring and dragging of chairs, we wanted to overlay the scene with some additional narration, but we couldn't. You can only attach sound to still images. This makes for a much simpler interface, but the end result feels like a silent movie from the 1920s. (Eventually, we started saving frames as JPEGs and used these as the backdrop for narration.) Additionally, Movie Builder only recognizes WAV (Windows audio) files or the audio accompanying other AVI files. It did not recognize MP3 (Moving Picture Experts Group Audio Layer 3) files when we tried to attach them to stills as background music.

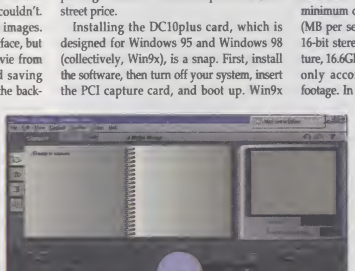
We spent some more time tinkering with clip lengths and creating more title scenes with narration. Once we had the Storyboard scenes laid out and configured, we clicked Preview The Movie to make sure everything flowed smoothly. We noticed the transitions between scenes were fairly jumpy, but this smoothed out after we went on to the next step, which is to click Build The Movie. This button gives the command to save the entire creation as an .AVI file. After that, our movie was made. We closed the Intel software and double-clicked the new file in My Computer. Our default video player, RealPlayer G2, popped up and began playing the movie.

Movie Builder is a simple, intuitive application that we were able to grasp without referring to any documentation, which is good because it doesn't come with much. Of course, Movie Builder is actually a secondary benefit to the PC Camera Pro Pack. First and foremost, the camera is designed to capture live footage for videoconferencing and stills to put on Web pages and attach in e-mail messages. So, if you need a Web cam and want to get your feet wet in digital video, this is an economical way to start.

Pinnacle Systems' DC10plus.

When you're ready to step beyond videos that feel like PowerPoint presentations, it's time to try a more powerful solution. We selected the Pinnacle Systems (http://www.pinnaclesys.com) DC10plus PCI (Peripheral Component Interconnect) video capture card package in this category not only for its analog-specific inputs and outputs and formidable Studio software package but also for its impressive $130 street price.

Installing the DC10plus card, which is designed for Windows 95 and Windows 98 (collectively, Win9x), is a snap. First, install the software, then turn off your system, insert the PCI capture card, and boot up. Win9x automatically detects the card and proceeds without a hitch. Even better, when you first run the Studio software, the miroVIDEO EXPERT test pops up and diagnoses the state of your PC configuration and which recording specifications would be best suited to it.



This blank capture screen is the starting point for most Studio projects. Here, we've expanded the video and audio controls to demonstrate the wide range of setting controls that are available.

The Studio interface is relatively straightforward, but still offers its share of twists and turns. Near the top of the screen are three self-explanatory tabs: Capture, Edit, and Make Movie.

Capture. The Capture module offers two areas for fine-tuning video and audio details, such as S-Video or composite input, color controls, and audio volume level. To begin recording, just click the Start Capture button, press Play on your tape source, and you're in business. You also can instruct Studio to only capture for a specified time. Also, the application will intelligently detect your footage's scene breaks and lay them out for you to peruse in the Edit mode, which is a real time-saver.

As always, watch your storage space in regard to your recording specs. By clicking the Settings button, we specified a 608 x 464 pixel resolution, which is the same as the standard VGA (Video Graphics Array; 640 x 480 pixels), but trimmed down to dispense with the excess data that can't be viewed on a TV. With the minimum compression rate of 3.1:1, a 6MBps (MB per second) data transfer rate, and full 16-bit stereo/44.1KHz (kilohertz) audio capture, 16.6GB (gigabytes) of storage space could only accommodate 40 minutes of video footage. In contrast, the lowest setting (called Good—320 x 240 pixels, 23:1 compression, and 800KBps data transfer rate) yielded about four hours and 40 minutes of space. You'll need to experiment with your storage and specification settings before starting your capture sessions to avoid overflowing your hard drive.

Edit. With the initial capturing done, it's time for the Edit module. On the top half of this screen's left side is an album with four tabs: Show Videos, Show Graphics, Show Transitions, and Show Sound Effects. To the right of this is a preview player for watching your movie clips and overall masterpiece in progress. The bottom half of the screen offers three different views of your movie layout. Storyboard, which is similar to Intel's Movie Builder; Timeline; and Text. We found Timeline the most useful by far.

Within the four tabs of the Edit Album is a fairly large collection of tools and resources

although learning to harness them can take some patience and practice. Studio lays out the scenes from all your video captures under the first tab (Show Videos). Inserting one of these scenes into your movie is merely a matter of dragging and dropping it from the Album to the movie window in the Edit screen's lower half. Just flip through the album pages and insert scenes at any place you like in the movie's sequence. Highlighting any item in the movie window and clicking the toolbox icon brings up an editing window where you can edit your movie elements.

By default, the Show Graphics tab points to a collection of title graphics, such as "Merry Christmas" and "The End." Studio offers a strong title editor called TitleDeko that allows you to edit the title's text, font, effects, embedded graphics, transparency, skewing, and much more. TitleDeko really makes your movie titles pop out and come to life. Be sure to use the little file cabinet icon that allows you to browse your drives and select regular still images from your hard drives. As with Movie Builder, still images can be set to display for a given amount of time, but instead of attaching sound to the image, Studio uses sound in one of three separate audio tracks (more on this later).

The Show Transitions tab opens to a nice collection of 255 different screen wipes, fades, and other impressive transitions. This is more than twice the number of transitions available in competing products, and although they are a bit much, they are fun to play with.

The Show Sound Effects tab is obviously for sound effects, and Studio comes with a collection of 165 of them, such as bells, gunshots, and splashing water. Studio also includes a wonderful tool called SmartSound, which offers a collection of various musical types, tracks, and versions. Just select the music you want, click the length of video segments you want to create background music for, and SmartSound automatically creates a music layer long enough to match your video selection.

However, the default music samples can get a bit cheesy; fortunately, Studio allows you to import tracks from music CDs as well as WAV files from your hard drive. For instance, we replaced The Great West theme song that accompanied the default Studio video and replaced it with a lively dance track we had on hand. You also can use the Edit Toolbox to create voice narrations.

As we mentioned, Studio allows for three audio tracks. First is the native audio that accompanies the video footage. This appears as a thin sound wave line right below the video clip in the Timeline view. The Timeline view's second track displays a similar sound line for any narration or sound effects you add. The third Timeline track is for background music files. By clicking any of these sound lines, you establish a node point on the track. To adjust the volume, drag these nodes higher and lower. For instance, you may want the music to recede a bit as characters in your video are conversing, then rise gradually back up as they walk off-screen.

If you want to use Studio to slap together a quick movie, the process is similar to Intel's Movie Builder. Go into the Show Videos tab in the Edit module and switch to the Storyboard view. Drag your clips on to the storyboard in any order and then drag down any transitions you want between these clips. When done, open the Edit Toolbox to trim your long video segments into manageable clips. With the videos now arranged in their proper lengths and order, create or browse to any sounds you want to incorporate by using the Edit Toolbox's bottom four icons: voice, music, CD

Five Tips For Better Shooting

Sure, all those famous movie directors spend years in film school, pay their dues as set designers and gophers, and finally get the chance to hobnob around Cannes, but do they really know all the secrets of shooting great movies? Chances are, they do, but here we share some simple ideas for how you can make your videos better.

1. **Make a storyboard.** When professionals make movies, every scene is mapped out in advance, often as sequential cartoons. You can do the same thing with a script, with one column on your page noting the order of visual scenes and a second column showing the corresponding spoken lines and audio background. Planning out a movie before you walk out the door to shoot it will save you hours of editing and reshooting.

2. **Get good audio.** When you shoot footage from across a room, your subjects' voices are often distant and garbled, which makes for a terrible soundtrack. Use your camcorder's microphone jack and add a good clip-on or even wireless microphone so you can capture an event's audio cleanly.

3. **Use flattering light.** When shooting outdoors, try to avoid direct sunlight because it casts harsh shadows, especially on faces. Even, overcast daylight is much better. When shooting indoors, beware of a strong single light source, such as a spotlight. Counter-balance this with "fill" light coming from another direction to help fill in shadows. (A little bit of shadowing is good for establishing depth in a subject, but not too much.)

4. **Beware of strong backlighting.** Unless your camera offers manual exposure control, your camera will typically expose your image for the brightest present light. If you're shooting a person illuminated by regular indoor light, but there's a bright lamp blazing in the background over his or her shoulder, the camera will expose for the bright lamp and leave your subject in the dark.

5. **Think MTV.** Today's video viewers are easily bored. Everything must be in a near-constant state of change to hold their attention. If you have to take a prolonged shot of something, like a head shot of great-aunt Myrtle recalling the Depression years, try to intersperse her running audio commentary with alternate visuals, such as still images of Depression times or the faces of other people in the room listening to her. If all the viewers see is a stationary aunt Myrtle for 10 seconds, they will get bored. □

music, and level mixing. Add a title or two with TitleDeko, use the Preview window to sample the goods, and then move to the final program tab, Make Movie.

Make Movie. In Make Movie mode, Studio can output your work to either videotape (via the DC10plus PCI card's output ports) or to a hard drive-based AVI file. In addition, the Intelligent Rendering feature allows Studio to overcome the Microsoft Video For Windows 2GB limit on output files.

When making a file, be careful which codec (compressor/decompressor) you use. Studio defaults to its native Motion JPEG codec but this will only work on a system running a DC10plus video capture card. You also can use other more universal codec standards, such as Intel's Indeo. Additionally, Studio allows you to select attributes such as resolution, frame rate, and audio sample rate. That way, you can take a project of several gigabytes and crunch it down until it's small enough for output to a single CD-R (compact disc-recordable).

In general, we found the Studio DC10plus a joy to work with only one glaring exception. Once we fell in love with the idea of synchronizing scene changes with background music, we discovered how frustrating this could be when editing the length of any given video.

As we mentioned, we took Studio's built-in demo movie, "A Day in the Park," and replaced its Great West soundtrack with a thumping dance tune. We had six video clips on the Timeline, but the cuts and transitions between scenes were completely out of synch with the underlying music. The movie lasted roughly 39 seconds, but there was a perfect fade-out point in the music at the 36-second mark. We highlighted the final scene and dragged its right edge three seconds over on the Timeline. Sure enough, the end of the movie now synchronized beautifully. However, we then noted the timing between the first and second clips needed to come two seconds earlier, so we shortened the first scene similarly, only to stare in frustration as every other clip on the Timeline scooted over two seconds to fill the gap, undoing our previous synchronization efforts.

There are two morals when editing in Studio. First, work from beginning to end on your project. Second, Studio has its limitations. We never were able to get our audio and video tracks timed up properly. Fortunately for picky users who aspire to create professional-quality movies, there are more advanced packages.

We used Studio's file cabinet icon to browse a local hard drive for still images. Clicking one of the graphics displays it in the preview monitor.

■ Pinnacle's DV500 & Adobe Premiere.

The odds are good that while you may still be using an analog camcorder today, you can see yourself transitioning into a DV camera in the future. However, nearly all DV equipment uses a data cable and jack format called IEEE 1394 (FireWire), and analog cameras use composite or S-Video jacks. How can you learn the ropes on your existing analog equipment without incurring an extra round of upgrade expenses when you go to DV?

Pinnacle Systems offers one exemplary solution. The DV500 retails for $999 but offers nearly all the functionality of video systems in the $4,000 range. The Pinnacle card offers three IEEE 1394 ports (two external and one internal), which will serve you well as the high-bandwidth connection gains popularity in the performance market. The key to analog support is the unit's "breakout box," an external console with input and output jacks for S-Video, composite video, and left and right audio channels. When you're ready to shelve your analog equipment, just disconnect the breakout box and plug straight into the IEEE 1394 ports.

The DV500 and its bundled Pinnacle software are heavily slanted toward digital work. The included DVTools title can perform a host of cataloging and capture features that don't apply in the analog format. However, we found importing video from our Hi8 camera was anything but intuitive. There were several options menus that required adjustment each time we started the software. But once configured, the importing went beautifully, and the playback from hard drive on our test system looked like watching television.

Of course, a hardware package is only as good as the software supporting it, and Pinnacle elected to bundle in Adobe's Premiere 5.1, the acknowledged leader in professional-level video production.

If you've never seen Premiere before, the opening barrage of windows and options can be a bit overpowering, especially if you're graduating from a lower-end package. You can simplify this by running your screen resolution at 1,024 x 768 pixels to fit more information on the monitor, and by only displaying the Timeline, Monitor, and Project windows.

By default, the Timeline offers three video tracks, a transition track, and three audio tracks, but you can create more. As in Studio, Premiere's first audio track offers a volume and balance line that you can adjust on-the-fly by clicking to create "pullable" nodes called handles. Another trick is that video track 2 sports a similar adjustable line for opacity, making gradual fades into another video clip a three-click affair rather than having to navigate a series of dialog boxes. Even better, you can link the audio and video tracks to perform synchronized cross-fades between clips.

Monitor uses two playback windows, the left (Source) for editing individual clips and the right (Project) for previewing your entire video. The Project window displays all the files you're using in your work of art. One tip we have is that if you use video clips or still images from a CD-ROM, copy them to your hard drive before importing them into your project. This will speed up your playback times and free you from keeping the CD in your system every time you work on the project.

To capture footage in Premiere, open the File menu and select Capture, Movie Capture. This brings up the Movie Capture window, which you can fine-tune by right-clicking the window and selecting Recording

One of Premiere's distinguishing features is its ability to add special effects *to clips.*

Options. There are more alternatives provided under the Settings choice and the Video Input tab therein. Only when we switched the Composite Video option here to S-Video were we able to receive footage from our camcorder.

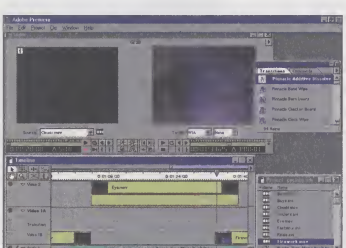
When we finally had our capture configuration straightened out, we recorded our holiday event into two large files named Temp4.avi and Temp5.avi. We then opened the File menu and selected Import, and File to bring both of these clips into the Project window. From there, we selected the Temp4.avi file and dragged it into the Source Monitor window. To create a small clip, we just scrolled through the Temp4 file. When we came to a good part, we carefully set the in and out points. With the clip marked out, we opened the Project menu and selected Create, Subclip, gave the clip a name, and it appeared in the Project window, ready to use. This is by far the easiest way of making clips we've seen.

We pulled about two dozen clips from the Temp4.avi and Temp5.avi files, imported some good soundtracks from our existing music collection into the Project window, and dragged the pieces we wanted onto the Timeline using essentially the same processes as in Movie Builder and Studio. That's about as hard as it gets to make a simple Premiere movie. Of course, the beauty of Premiere is its high-caliber extras. We don't have space to detail all of them, but here are a few we sampled.

One of Premiere's distinguishing features is its ability to add special effects to clips. You'll find a plethora of filters, such as Gaussian blur, lens flare, and wind effects, which you can set to appear at any point in a clip with varying levels of intensity. For instance, to break up the monotony of indoor footage, we inserted a short clip of clouds moving across the sky. Not content with that, we clicked Clip, Filters, Lens Flare and added some zany narration, describing it as the alien craft seen hovering over our ceremony's site earlier that day.

After the frustration of trying to synchronize sound and scene changes in Studio, this process was a snap in Premiere. We played the video in progress in Monitor and clicked Pause at any point the music suggested a good scene change. Premiere displayed our position with a vertical line cutting across the Timeline. This line functions as a snap-to guide, so when we grabbed the edges of our clips in Timeline and moved them, they "snapped" on to our time marker. This way, getting the out point of one clip and the in point of the next to synch with the music only takes a couple of seconds. You can get even more precise control by editing the in and out points of the clip in the Monitor's Source window, where clip lengths can be specified down to the individual frame.

You also can use transparency settings to run two video clips side by side in the same window for a split-screen effect. If you need to increase or shorten a clip's length without snipping any of its content, you can modify its playback speed by clicking Clip, Speed. This allows you to create interesting slow-motion effects.



Adobe Premiere is loaded with options for moving between video clips. Here, we used the opacity property of the eye clip and gradually faded it from 100% down to 0%, which allowed our other video clip to fade in.

Although Premiere's 94 transition effects may not sound as impressive as Studio's 255, Premiere displays each effect as an animated icon, so you can see the effects in action without having to click each one for a preview. Furthermore, the amount of customization you can apply to these transitions, including masking effects is remarkable, allowing you to achieve incredibly cool screen wipes.

Now, here's the only bad news. Although our test system had some impressive specifications, when we loaded several video clips into Premiere, our project generated numerous playback hiccups and system crashes. The moral is that if you're serious about your video, be prepared to invest in a serious system.

The DV500 package is impressive enough with just the card and Premiere, but Pinnacle also throws in several other titles that really complete any full-featured video solution. Pinnacle's TitleDeko is included here, and if Premiere's 94 transitions aren't enough, you can use Pixélan's Video SpiceRack, which has more than 300 2-D transitions or Pinnacle's own Hollywood FX Copper and FreeFX Premiere plug-in for stunning 3-D transitions. A full version of Sonic Foundry's ACID Music is bundled, allowing you to create very nice looping background music tracks. Finally, Minerva Systems' Impression is included for CD authoring, enabling you to even create interactive menus and self-starting movies for your friends, family, or clients.

Although we don't expect you to rush out and buy a $999 product for your home movies, Pinnacle's DV500 does demonstrate the breadth of functionality you should expect in a high-end video solution. However, the learning curve here is substantial. Unlike low- or midrange products, you're not likely to master the DV500 and all its applications in a day. But if you want to pursue digital video as a serious hobby or a professional service, these are the tools you will need. LS

by William Van Winkle

Create An Online Photo Gallery

Share Your Images With Friends & Family No Matter Where They Are

Maybe you've just had a baby and you want to show the rest of the family its newest member. Or, perhaps you just completed your lifetime dream of traveling around the world. Maybe you have been taking pictures for years, and you want to set up a portfolio to show prospective employers your capabilities. No matter what your reason, the Web is your best friend when it comes to broadcasting images to an audience around the globe.

Forget about making expensive prints and spending money on postage so you can mail your photographs to your friends and family. Using tools available online and some that you can download for free, you don't have to spend much money to create an electronic photo album to display your images. Of course, if you have the money to invest in some premium software, you can create a serious display with minimum effort. You can turn your mediocre camera skills into stellar showcases by following a few commands.

Before getting started arranging your images into a gallery, you'll need a few pieces of equipment. Needless to say, you should start with some pictures. If you have a shoebox or filing cabinet full of snapshots you've been meaning to post online, then you need to get them into digital format.

Going Digital.

Graphic images need to be in one of two formats before they can be displayed online: JPEG (Joint Photographic Experts Group) or GIF (Graphics Interchange Format). Technically speaking, you can save images in PNG (portable network graphics) format, as well. That format is better at certain tasks, such as making transparent images, but older Web browsers don't support PNG images and they won't display properly.

GIF files are good at handling simple images such as small icons because they contain only 256 colors. But because you're working with photographs, you'll want to use JPEG. This format can save millions of colors and can display images with complex color gradations, as well. Whichever format you choose for your pictures, you can reduce their sizes (and consequently quality) so they load faster by altering their resolution. We'll have more information about that later on.

The best way to digitize an image is to scan it. For between $150 and $300, you can pick up a standard, midquality flatbed scanner. Sheetfed scanners are a good option if you're processing odd-shaped items, such as legal-sized paper, but they work great with pictures, too. These scanners, which are roughly the same size and shape of a paper towel roll, are a bargain and retail for less than $100. If you scan only photographs, then you can pick up a photo scanner. These produce tremendous quality for pictures, but spending between $200 and $500 for something with such limited capabilities may be a bit hard to justify. Film scanners are the option for professional photographers who want to make an online portfolio, but lower-end models start at around $350, which is an amount better left to a tax write-off.

From Kodak To Computer.

If a scanner isn't in your budget but you still want to put the pictures of your parents' wedding anniversary online, don't fret. You don't need to go any further than you usually go for

Key Points

- Posting your photos online takes a lot of the hassle out of sharing your pictures. Anyone anywhere in the world can see what you've taken without you having to order extra prints and pay postage.
- If you don't have a digital camera, you can scan in your print photographs for online posting.
- Keep in mind that when dealing with images on the Web, fast loading is more important than pristine quality. Keep your images' sizes and resolutions small.

photo processing to convert your photos into digital graphics. It usually costs a little more than regular print development, but for a nominal fee (about $5) photo development companies, including Kodak, will develop and post your pictures on a private Web site. Most of these services will send you an e-mail notification when the images are done, and you can download them directly to your computer. In some instances (depending on the service and what you pay), you'll also receive a disc containing your images.

You can put together a gallery online with Zing.

America Online members have access to an even simpler method of getting their pictures transferred from film to digital format. With a service called You've Got Pictures, members can drop off their film at any retailer that offers Kodak photo processing and have the images e-mailed directly to their AOL account. Just put a check mark in the You've Got Pictures box on the processing form, and when your photos are ready, you'll see a You've Got Pictures icon appear below You've Got Mail. Plus, almost all of Kodak's 38,000 photo processing retailers nationwide offer the service. Your film is digitized and the images delivered to your AOL account within 48 hours of drop-off.

Of course, you can cut out the whole paper-to-pixel process and take pictures with a digital camera. These used to be clunky, hideously expensive beasts with mediocre quality. However, as prices have dropped and quality has improved exponentially, digital cameras have exploded in popularity and are an excellent tool for even recreational photographers. You can spend as little as $200 or as much as thousands of dollars, depending on the sophistication level you desire. Regardless of what you spend, digital cameras are a quick and easy way to put photos on the Web because they take the worry and expense out of film.

Some models transfer images on to a diskette so you can quickly transfer the images to your hard drive. Other digital cameras come with a cable that links the device to your computer so you can transfer images over the wire.

■ **Software Touch-up.** Now that you have your pictures loaded on to your computer, you probably have a better view of the scratches, red eye, and lopped-off heads that your camera captured. You can touch up these photos with the help of a host of programs specifically designed to make your pictures pristine. Any number of free graphics editors helps you crop, fade, reduce resolution, and otherwise improve imperfect pictures that result despite your high-tech equipment.

These packages also usually provide the means to dress up photos by adding text, changing the appearance of an image (such as making it look like it has water drops on it), and adding backgrounds and borders. They even usually come with built-in processes and templates for creating special effects, such as wrapping the image around a sphere.

Many scanner packages also come with some kind of photo editor included. Adobe PhotoDeluxe is one outstanding example. It's a relatively simple standard package that includes a great step-by-step process for beginners. If this package didn't come with your scanner, you can buy it for about $40. Another simple yet sophisticated photo editor is Jasc Software's Paint Shop Pro, which contains many of the same features, and at $100, it's far less expensive than some of its contemporaries. You can download a shareware trial version for free from http://www.jasc.com/download_4.asp.

Because you want to publish your pictures on the Web, you should look for software that helps you organize your images and possibly even upload them to your ISP (Internet service provider) in one effortless step. One program that stands miles above the rest in this respect is Adobe Photoshop 5.5. Technically speaking, it's not completely Photoshop. ImageReady,

Terms To Know

GIF (Graphics Interchange Format)—A graphics file format used for displaying images on Web pages. Originally developed by CompuServe, GIF format is better for simple pictures because it uses only 256 colors.

JPEG (Joint Photographic Experts Group)—A graphics file format that can handle millions of colors in an image and can compress files to about 5% of their original size.

pixel—Short for picture element, this is the smallest part of an image that a computer can display or control.

PNG (portable network graphics)—A newer graphics file format built to compete with GIF. It creates simple images with less distortion. PNG is approximately 10% to 30% more compressable than GIF, has 48-bit color, and can display an image at one resolution and print at another.

red eye—The effect of a photographic subject's pupils turning red in an image. This is caused by the camera's flash bouncing off blood cells in the back of the eye.

resolution—This is the sharpness or clarity of a picture represented in dots per inch (dpi). The amount of dpi is determined by how many pixels make up an image. The higher the resolution of a picture, the better the quality.

thumbnail—A smaller version of a graphic or document page that takes up less space on-screen to allow multiple images to be viewed simultaneously. These smaller images also are faster to load than full-size images. On the Web, a thumbnail graphic can sometimes be clicked to begin the automatic loading of the full-sized image.

which is another Adobe package used for optimizing images for online publication, makes up half of this latest version of Photoshop. But because ImageReady is no longer sold separately and because it looks, thinks, interacts, and feels just like Photoshop, they're virtually one in the same.

Instant Web Gallery Photoshop makes quick work of reducing pictures into quick-loading thumbnail images and creating the HTML (Hypertext Markup Language; the coding language in which Web pages are written) to link the thumbnails with the full-sized images. The Web Photo Gallery function does all this dirty work for you just by selecting one command. All you have to do is trigger the process and upload the completed work to your ISP.

The first step to using Photoshop, or any other album-creating software, should be to store all the pictures you want to post in one directory (or folder) on your hard drive. This enables the program to go to one place to retrieve images, plus it helps you keep things organized.

For our example, we're going to put images of our trip to England online. Once you have all your photos in your folder (in our case, we're going to name the folder England), then you can use Photoshop's Web Photo Gallery function. It instantly creates an HTML contact sheet with captions, which you can then put online as a whole.

Open the File menu, choose the Automate command, and select Web Photo Gallery. In the Files menu of the Web Photo Gallery window, click the Choose Button By Source and browse to your main directory of images. Select the Include All Subdirectories checkbox if you have more images in other folders within the main folder. Next, use Choose Button By Destination to tell the program where to make a new folder containing all the coded pages and rendered images. Be aware that the input and output directories can't be the same; in other words, you can't create a new folder in your main folder. Create one in a different place on your hard drive. In our case, we'll create a new folder called England Web.

Next, under the Site section, create a title for your gallery; ours is called My Trip To England. In addition, enter your name under Photographer and enter the present date to create a record of when you created the gallery.

The Thumbnails area lets you specify how big you want the images laid out on the page to be. You'll click the thumbnail to access the larger version of the picture. If you are loading a number of images, you can opt for Small; if you only have a few, choose Large. The smaller your thumbnails, the more quickly your page will load. Check the Filename As Caption box if you want the program to display the name you gave the file as a caption. You can always go back and change this when you're touching up your photo album.

The Resize Gallery Images section is especially helpful. You can use this to standardize the size of your processed photos. You can make them small, medium, or large, or you can choose Custom to make them whatever proportion to the original you like. The Quality settings let you designate how crisp and clear the images are when you post them online. Use the slider for more control or choose the set criteria by using the drop-down menu. However, remember that the sacrifice for perfect images is loading speed. Small files won't be as attractive, but they'll appear quickly; large files will look better, but they'll take a while to come up.

Now click OK, wait a few seconds while Photoshop builds your album, and when it's done, it will automatically load the gallery into a Web browser. You can click the thumbnails to see the larger images, and use the arrows to navigate through the contents of the pictures.

The Price Of Quality. Before you grab your checkbook and run out to buy a copy of Photoshop 5.5, you should know that this software costs about $600. However, this package is by far the best for making photo galleries. It's a must-have for graphic artists and those who love playing with images more

Touch-up Tips

Images you post on the Web don't have to be perfect, but you can follow these quick and easy tips to avoid some of the headaches associated with creating online photo albums.

- **Have a backup.** Before you start to mess with your photos using photo-editing software, make a copy of the original. Believe us when we say it only takes one muscle spasm in the wrong place to irrevocably damage your prized picture. If you have a snapshot master copy, this isn't so important—simply rescan it. But if you took your digital camera along on your backpacking trip in the Rockies, you don't want to have to make a return trip to the top of Longs Peak just to reshoot the view, just save a separate original version.
- **Know your medium.** Consider size and resolution when you're ready to post your images on the Web. From a loading point of view, smaller is better, both in terms of resolution and actual size. The trouble with reducing the resolution of an image is that it reduces quality, too. However, because this is the Web, no one expects to see magazine-quality images anyway. You can safely sacrifice some definition for the sake of not jamming up your viewer's browser. Cropping an image is a good way of making images smaller so they load quicker and it helps take emphasis from unnecessary elements of an image and put more focus on the subject.
- **Clean 'em up.** Dust and scratches can ruin an otherwise pretty picture. But you can reduce their effect by making sure your slides, photos, and scanner are lint-free when you transfer images to your computer. Then, you can block out those blemishes by using the eyedropper tool that is available with many image-editing programs. Click the eyedropper icon and select a color similar to the shade where the dust or scratch is. Next, you can use the paint or pencil tool to color over it. Another way of removing flaws is to copy an area of the image that is of similar texture and color to the imperfect section. Then you can paste over it, and the overall effect will look more blended than using the flat color the paintbrush tool lends. □

Quick-Start Guide

Here's a summary of the steps you'll take to get your photo album online.

1. Scan your snapshots or take pictures with a digital camera and upload the images to your computer.
2. Next, optimize those images by reducing their size and resolution so they load up fast on the Web. Use a graphics-editing program, such as Adobe Photo Deluxe or Adobe Photoshop, to do this.
3. Organize the images in one folder and process them with photo gallery software.
4. Some photo gallery software asks you to create captions for your images before you process them, but you'll most likely do it at this stage. Choose short phrases that describe the image simply.
5. Now you can upload your photo gallery to the Web. You may find it helpful to put them in a separate directory to keep your site organized.
6. Finally, check all links and images to make sure the upload was successful.

than having a padded bank account. Even though ImageReady's capabilities are the best we've seen, it's not the only photo editing software out there.

MGI Software's PhotoSuite III, which rings in at about $50, also has loads of capabilities and is a much cheaper option. It too has a tool specifically for putting photographs into an album, but it doesn't have the automatic coding capabilities as Photoshop does. Use PhotoSuite's Albums, which is located under the Organize menu, to put together a gallery. The Master Album houses all the albums you create. When you want to make a new one, simply click the New button in the Master Album window. Use the Get command to insert pictures into the album. Although it isn't as robust as Photoshop, PhotoSuite is a super tool for beginners because all the processes are spelled out in a step-by-step manner. Simply follow the directions for touching up your pictures.

You don't have to pay anything to use Magic Series' MagicJpgHtmlPager. This mouthful of a publisher lets you automatically create an online photo album with ease. It takes your JPEG images and puts them into one of the about 50 design templates it provides. You can really choose just about any layout you want, from many thumbnail images in a row, to big pictures on every page of a larger album. The program walks you through the process, so you don't have to be an HTML pro to put together a cohesive photo album.

No-Frills Photo Albums. You can publish a photo gallery without the help of fancy and possibly expensive software, but that requires a certain amount of know-how and effort. In fact, if you're well enough acquainted with an FTP (File Transfer Protocol) program, such as CuteFTP (http://www.cuteftp.com), the Paint program that comes standard with the Windows operating systems, and Microsoft Word or FrontPage, you can put together a gallery on your own.

First, you'll want to touch up your photos. If you have some of the photo imaging software we discussed above, then you can use it to crop, splice, or otherwise fix your pictures. But Windows comes with Paint, which you can find by clicking the Start button, and selecting Programs, Accessories. Paint is an elementary but suitable tool for touching up images. Paint is best used to reduce your images and shape them so they're a standard size.

When your images are ready to be assembled, you can do it in Word. It's not the most sophisticated way of making online galleries, but it's simple. Once you've opened a new document, open the Insert menu and choose Picture, From File. You can then browse to where your images are stored, select them, and then click the Insert button to drop them on to the page. You can drag your images around the page to situate them where you want and easily add captions and text to them. When you're finished with your display, open the File menu and choose Save As Web Page. This puts everything into HTML code for you, so all you have to do is upload the page to your site.

Using FrontPage 2000 or Express is very similar to Word, except these programs are designed for arranging Web pages with fewer errors. As with Word, you can put photos into a page using the Insert menu process. If you have several small pictures, you can arrange them on the page a bit easier by using Tables (open the Table menu, select Insert, then Table).

Putting It All Together. Even if you've used an automated function such as Photoshop's Web Photo Gallery, FrontPage is useful for tweaking the site so it's customized for you. By using it or another Web page editor, you don't have to rebuild any pages, you can simply see how they look and make

changes as you would to a Word document. Go ahead and experiment with adding color, customizing captions, and inserting sound files to make the photo album uniquely your own.

When you're finished creating your album, you need to get it ready for publishing. The first step is to find somewhere on the Web to put the images. If you connect to the Internet using an ISP, then you probably already have some limited space on its server to store your Web documents. Next, find some FTP software, such as CuteFTP. This free program automates transferring files from your computer to your Web site. It's a simple process, letting you drag and drop files from one side of the screen to the next.

If you don't have an ISP that provides you with Web space, then you can use one of the several free services that provide Web real estate in exchange for a blitz of advertising. Angelfire (http://angelfire.lycos.com) and GeoCities (http://geocities.yahoo.com/home) are two such services that let you create a Web site. Both provide tools to automate loading your content from your computer to the site. MyFamily.com (http://www.myfamily.com) is another free service, but it has a section specifically for creating online photo albums.

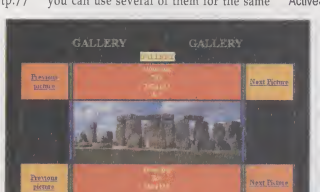
Doing It Online. Some services let you do everything online, from building the gallery, to touching up the photos, to creating a display space. One of the best benefits of the proliferation of free Web-based albums is that you don't need your own Web site to load everything, and most sites make the process incredibly easy. They definitely beat the old e-mail distribution route.

Zing is one such site that lets you create online photo albums, as well as e-mail greeting cards. You create a ZingAlbum, which is either a public or private area for you to display your images. In addition to featuring an easy way to submit photos (if you download the Drag-and-Drop plug-in, you don't even have to browse to the directory where you stored your pictures), add captions, and create slideshows, it features guest books so visitors to your album can add comments. You also can open your ZingAlbum to others who can then post their own images.

Adobe ActiveShare, which is available as a free download, not only lets you capture, manage, and organize your images but it also lends a few tools for enhancing them, as well. The simple photo editing features get rid of red eye with one click, and you can adjust the brightness and contrast of the picture in a similar fashion. The software synchronizes with ActiveShare.com, which is a free site you can use to post photos for private use or in communities you create for family and friends. As with Zing, viewers can add comments to your albums.

Get The Word Out. Now that you have your photographs out of the shoebox and on the Web, you can start showing them off to the world. If you want to show just your close friends and family your images, then you can send them an e-mail message with the URL (universal resource locator; a Web address) where you have your gallery posted.

ActiveShare and Zing are all about inviting people to look at your images, and they have built-in systems for asking friends and family to see your virtual photo show. These photo gallery sites are gaining in popularity and you can use several of them for the same purposes. Try the fun and funky The Digital Fridge or eCircles.com.



Don't want to buy an expensive package? You can do it yourself using Microsoft FrontPage 2000 or Express.

These Web services also have interesting (but somewhat expensive) solutions for your buddies who don't have e-mail yet: You can order print photographs through them. It's a little like taking one step forward and 20 steps back doing it this way, but at least you can send those pictures of your new puppy to your friends and family who haven't gotten swept up by the digital age. This is also a good option if you've taken pictures using only a digital camera because you can now have a tangible photo to hang on your wall.

Printers work, too. If you have a color printer, then you can get the full effect of the pictures. You also can try a local copy center, which will probably have better equipment than the average home office. Of course, you'll have to pay for the service because these companies charge dearly for their special tools.

Whatever virtual (or physical) exhibit space you choose, be it an expensive and capable package like Photoshop or a do-it-yourself special using tools that come with your computer, you'll find an online photo gallery provides a way of staying in touch with far-flung friends and colleagues that was never before possible. Who knows? You might just be discovered and become the next Ansel Adams. LS

by Monique I. Cuvelier

For More Information

Adobe
ActiveShare
PhotoDeluxe Home Edition 4.0
$49.95
Photoshop 5.5
$609
(888) 724-4508
http://www.adobe.com

The Digital Fridge
http://www.thedigitalfridge.com

eCircles
http://www.ecircles.com

MagicJpgHtmlPager
http://www.magicseries.de

MGI Software
PhotoSuite III Platinum Edition
$49.95
(888) 644-7638
http://www.photosuite.com

Microsoft Picture It! 2000
$54.95
(800) 360-7561
http://www.home-publishing.com/PictureIt

Zing
http://www.zing.com

Glossary

AVI (audiovisual interleaving)—A way of presenting a motion-picture video in an application window on a Video Graphics Array (VGA) or better monitor. AVI files have an .AVI file extension. To view them, some type of .AVI file player must be present on the system.

BCC (blind carbon copy)—An abbreviation of blind carbon copy, a feature found in many e-mail client programs. Recipients addressed under Bcc: will get the message, but other recipients under To:, Cc:, and Bcc: will not be aware of this. Bcc is a tool for sending someone a copy of an e-mail message without anyone else knowing about it.

BIOS (Basic Input/Output System)—(Pronounced bye-ose) A special piece of software built into most computers. BIOS routines control the startup process of the machines and other basic functions such as the keyboard, display, and disk drives. On older computers, the BIOS is stored in read-only memory, which is not erased when the power to the computer is shut off. Newer computers store BIOS on flash ROM, which can be erased and rewritten if the user needs to update the BIOS program.

cell—The intersection of a row and a column in a spreadsheet, such as cell A1, the cell at the intersection of column A and row 1. Each cell is a box that can hold text, a numerical value, or a formula.

chat—Live communication over the Internet or an online service. Unlike E-mail, with each person sending mail and waiting for a reply, chatting involves two or more people typing comments back and forth in a conversational style. As one person enters text, it appears on the other person's screen in real time. Chat rooms can be found on commercial online services such as America Online and by using Internet Relay Chat software with an Internet connection.

codec (compressor/decompressor)—Any technology used to compress and decompress data, which can be done with hardware, software, or a combination of the two. Different technologies perform this in different ways. For example, MPEG is a video codec, named for the Moving Picture Experts Group, that compresses full-motion digital video, and it requires special hardware for decompression.

e-commerce—Short for electronic commerce, or business conducted online. The term applies to everything from consumer purchases to corporate purchases where the transaction takes place online. E-commerce applies to more than just online sales, however. It can also refer to using the Internet for business purposes, such as E-mailing newsletters to customers or providing a Web site with information for prospective customers that results in phone sales or inquiries.

formula—An expression telling the computer which mathematical operations to perform upon a specific value. Formulas are most often used in spreadsheet programs.

FTP (File Transfer Protocol)—A standard way to transfer files between computers. The method has built-in error checking. It is frequently used as a way of transferring many types of files over the Internet.

HTTP (Hypertext Transfer Protocol)—The set of standards that let users of the Web exchange information found in Web pages. You can use a Web browser, such as Microsoft Internet Explorer or Netscape Navigator, to read documents formatted and delivered according to HTTP. The beginning of every Web address, "http://", tells the browser the address' document is HTTP-compatible.

inkjet printer—A printer that forms letters on the page by spraying tiny streams of quick-drying ink. The ink is stored in disposable ink cartridges. Inkjet printers are known to have some problems, including occasionally bleeding inks and slow printing speeds. They do, however, have many good points. In terms of print quality, inkjet printers come close to matching the quality of print produced by laser printers. In terms of price, inkjet printers come closer to the dot matrix printer. For the latter reasons, inkjet printers are quite popular among home computer users.

MFD (multifunction device)—These devices are also known as multipurpose printers and multifunction peripherals. An MFD typically combines copying, faxing, printing, and scanning chores all in one machine, which saves users from purchasing and finding space for four separate machines. While convenience is an advantage, the disadvantage of a multifunction device is the risk that if one component fails, the entire machine could become inoperable.

pixel—The smallest part of an image that a computer printer or display can control. An image on a computer monitor consists of hundreds of thousands of pixels, arranged in such a manner that they appear to each be connected. Each pixel on a color monitor comprises three colored (blue, red, and green) dots. The term comes from the words picture element and also is abbreviated PEL (pronounced pell).

SCSI (Small Computer System Interface)—(Pronounced scuz-zee.) A standard for parallel interfaces that transfers information at a rate of up to 80MBps (megabytes per second). Up to seven peripheral devices, such as a hard drive and CD-ROM drive, can attach to a single SCSI port on the system's bus. SCSI ports were designed for Apple Macintosh and Unix computers but also can be used with properly equipped PCs.

spreadsheet—A worksheet consisting of rows and columns that manipulate and display numerical data. Computerized spreadsheets include built-in calculating tools to perform mathematical functions using the data in its cells. For example, rows and columns can be totaled or programmed to compute an average profit. As data is changed in each cell, the computer automatically makes new computations. Microsoft's Excel and Lotus are two of the most popular spreadsheet programs.

SSL (Secure Sockets Layer)—The most popular security protocol for the Internet, provided by Netscape Communications. SSL encrypts data that passes over the Internet. Netscape Navigator and Microsoft Internet Explorer support SSL.

WORM (write-once, read-many)—(Pronounced worm.) A CD-like device that allows data to be recorded on it and then read over and over. Popular for data archiving because of its large storage capacity, WORM discs have yet to be given a standard format, thereby requiring users to use the same format. Should not be confused with CD-ROM, which does not allow data to be written to the disc.

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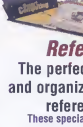

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